

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Steam Hammer by Richard Dudgeon.

We publish herewith an illustration of a steam hammer just completed by Mr. Richard Dudgeon, for Messrs. Crooke & Libby, Bath, Maine. It has a 10-inch cylinder and strikes a 2 1/2 ton blow. The length of the stroke is 2 feet 6 inches, diameter of cylinder 10 inches. The steam pipe is 2 1/4 inches diameter, and exhaust 3 inches. In the larger sizes such as shown in the accompanying cut, the piston and piston rod are of one piece. In the smaller sizes they are screwed together. The piston rod is octagonal in shape, the diameter across flats being 7 1/2 inches. To insure a perfect connection of die and ram, the former is attached to the latter both by keying and by dovetailing, which at the same time permits rapid removal.

As the anvil rests upon, and at the same time is surrounded by a system of timbers firmly bolted to the columns, the amount of foundation (an important and often costly item of steam hammers), becomes less, and a saving is thus effected. The distance in the clear between the two columns is 5 feet 2 inches, thus affording ample space. The hammer is manipulated by one man, who regulates the stroke by two levers, one of which operates upon a throttle of the steam pipe, while the other serves to move the slide valve. The framework is substantial. Six sizes are at present made; the smallest forging any size up to 5 inch square; the 2d, up to 8 inch; the 3d, up to 12 inch, and so on up to 26 inches square, the blow with the latter size being 11 tons. Mr. Dudgeon's hammers are being used by a number of our most prominent machinists and railroad companies, as well as in several navy yards.

Prehistoric Civilization in Arizona.

Mr. Hiram C. Hodge has written, and Messrs. Hurd & Houghton have published, a work of very great interest on the relics of a prehistoric civilization in Arizona and New Mexico, which in many respects an important contribution to American archaeology. The following brief synopsis of its contents will be read with interest: It has been a common belief that San Augustine, Florida, was the first European settlement within the present domain of the United States, but according to the author, San Augustine comes third in date of settlement—Santa Fe, in New Mexico, being first, and Tucson, in Arizona, second. According to the author, who bases his statement upon information industriously gained during an extended tour of the territory, about 30 years subsequent to the conquest of Mexico by Cortez, or near the year 1551, the early Spanish explorers and the Jesuit Fathers penetrated into this then unknown country. In 1540 a Spanish expedition traversed Northern Sonora, New Arizona and New Mexico. They carried back with them to the city of Mexico wonderful accounts of the country, and of reports gathered from the Indians of the seven wonderful cities of Cibola, which other Spanish expeditions went in search of, and which are now supposed to have been the seven towns originally built by the Zuni Indians many hundreds of years since. About the year 1560 a permanent settlement was made by the Spanish explorers and Jesuit Fathers at or near where Tucson now is.

AN ANCIENT TOWN.

The reader will, doubtless, be interested in the present condition of this quaint place, where the Jesuits began, over three centuries since, their first work of Christianizing the American Indian. Tucson is situated in the beautiful valley of Santa Cruz, 300 miles east of Yuma, 125 miles west from Apache Pass, and 70 miles north from the Sonora line. It has a population of 4000, one-third being whites and two-thirds Mexicans. The Santa Cruz River waters the valley of the Santa Cruz, south of Tucson. The valley has a very rich soil, and portions of it have been cultivated for one or two centuries, and produce equally as well now as when first known to our people. The town of Tucson is built up almost wholly of adobe (sun-burned brick), and to one unaccustomed to that kind of material, it presents a quaint and curious appearance. Buildings erected of this material are extremely cool and comfortable in the hot and dry climate of the country. Tucson has two hotels, a county court house and jail, 15 general stores, a branch United States depository, two breweries, one news-depot, ten saloons, four boot and shoe stores, four feed and livery stables, a public school-house and about 300 pupils; a Catholic school, under the charge of the Sisters of St. Joseph, with 200 pupils. The business of Tucson amounts annually to over \$1,500,000. A good portion of the trade is with Sonora, the merchants exchanging dress and fancy goods, boots and shoes, groceries, notions, etc., for flour, oranges, lemons, tobacco, cigars, and silver coin, of which large sums are annually brought from Sonora, where there are two coinage mints, one at Hermosilla and one at Alamos, both of which coin from \$50,000 to \$200,000 per month. Tucson is the central point for the business of Southern Arizona. It is stated that general good feeling exists between the white Mexican population, and a large number of white men have married Mexican women, who make "kind, pleasant and affectionate wives." Many of the wealthiest and most successful business men of the ter-

ritory reside at Tucson, where they have accumulated handsome fortunes in trade, government contracts and general business enterprises.

ANCIENT RUINS.

Perhaps the most interesting chapter is that devoted to a description of the ruins and relics of a prehistoric race who once inhabited Arizona—a race well advanced in civilization, and possessing many of the comforts and conveniences of civilized life. These ruins consist of towns and cities, of irrigating canals, stone implements, pottery-ware, etc., and of rude hieroglyphics and pictures of men, animals, birds, reptiles and other objects, animate and inanimate, painted on, or cut deep into rocks, in different sections of the Territory. In the great valleys and plains bordering the Gila and Salt Rivers, the buildings were constructed almost wholly of concrete, while those in the mountains were mostly of stone. The aqueducts, or irrigating canals, were of great length and size, and conducted the water from the great rivers far over large tracts of land now incapable of cultivation for want of water, and which must at that time have been well supplied and cultivated by that old and

much of interest to the thinking mind, and when examined by some one versed in hieroglyphical reading, may be found to give some clew to the time of making and the people who made them.

PREHISTORIC BUILDINGS.

The best preserved building in the valley of the Gila has been designated the "Casa Grande"—the great house—though in size it is much inferior to many others, but being preserved is so called. The Casa Grande ruin is 45 feet wide and 63 feet long, and the walls now standing are nearly 40 feet high, or 4 1/2 stories. The walls are of concrete, 5 feet thick at the base, and the tiers of concrete are 30 inches each in height. Six miles east from Phoenix are the ruins of a large town, near the center of which is one very large building 275 feet long and 130 feet wide. The debris of this building forms a mound which rises 30 feet above the surrounding plain. The walls are standing about 10 feet in height and are fully 6 feet thick. There seem to have been several cross walls, and the whole was surrounded by an outer wall which, on the south side, was 30 feet from the main wall, on the east 60 feet, on the north 100 feet, and on the

west side 60 feet. On the north and at the northwest corner were two wings, perhaps guard or watch-houses. On the south of the outer wall was a moat that could be flooded with water from a large reservoir 50 yards to the south. Several other large reservoirs are at different points in and around the main town, which was over two miles in extent.

On the line of the branch canals, distant many miles from this one, are other ruins of towns similar to others described. Below the great canal and the large ruins alluded to above, extending through what is called the Tempe Settlement, are other irrigating canals of nearly equal size to the others, and which were taken out of the river many miles below the large one, and along these are also ruins of great houses and towns. Some of the ruins in the Pucio Viejo Valley are near mountain spurs, where rock is abundant, and these were built of stone instead of concrete. This beautiful valley is 150 miles northeast from Tucson, and contains about 100,000 acres of choice farming land, which was evidently all cultivated by the old prehistoric race. Toward the upper end of the valley, on a piece of table land, are the ruins of a considerable town; large reservoirs, some round and some square, connected by canals. One of these

down the river, and a half mile east of it, on a stretch of table land elevated above the river bottom 100 feet or more, is what was, as is supposed, an ancient burial ground. It covers nearly 100 acres of ground. The graves were inclosed by stones placed in an oblong circular form, from 2 to 6 feet in diameter.

THE CAVE DWELLERS.

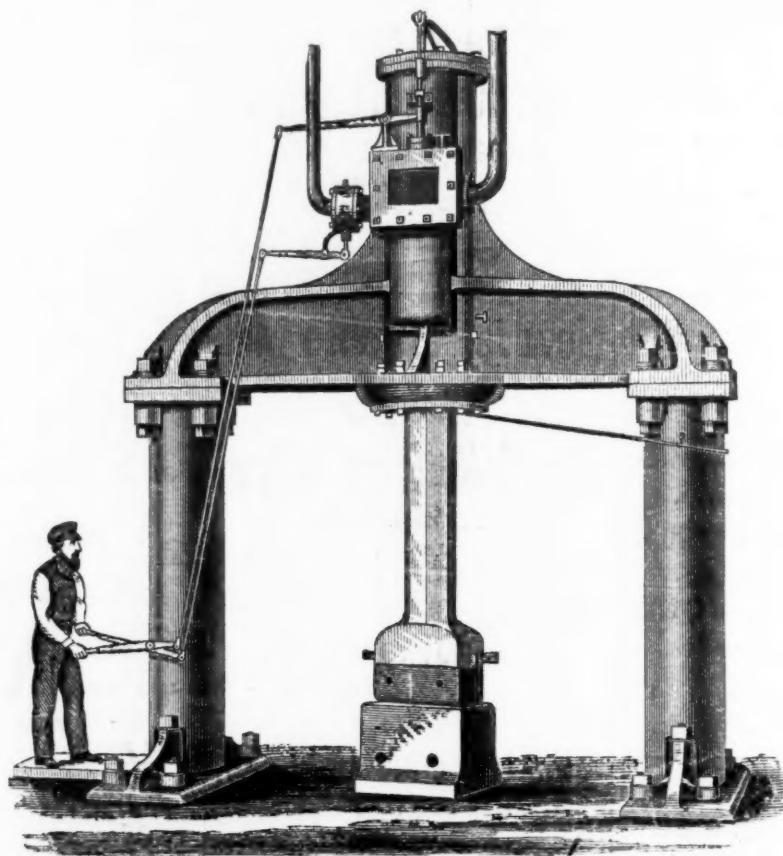
Beaver Creek enters the Verde River a half mile above Camp Verde, coming in through the northeast. This section of country is a limestone region, in which are some of the most interesting cave dwellings to be found in Arizona. Beaver Creek is hemmed in much of the distance for many miles, by abrupt, perpendicular bluffs of limestone, in which are many interesting old cave dwellings. They are mostly walled up in front, and at a distance look like the natural stony bluffs. In two of these canons, six miles up the creek on the north side, are several caves some 20 feet above the creek, in two of which are perfect cisterns, made of cement, and almost as hard as marble, and as perfect as when made. On one of them are prints of the hands of their makers, indented in the cement while in a plastic state, and also the print of the tiny hands of a small child, no doubt made by the little one in childish play.

Three miles below these caves are numerous others in a high bluff, on the north side of the creek. The bluff is nearly or quite 400 feet high, and is almost perpendicular. The largest of the caves is 90 feet across in front, walled up to its very top, a distance of over 50 feet, and difficult and dangerous to enter, as the opening is nearly 100 feet above the base of the cliff. The debris from the cave is piled up against the foot of the perpendicular wall rock for nearly 100 feet, from which point explorers must climb the face of the vertical wall nearly the same distance to reach the opening of the cave. This must be done by clinging to holes and jutting points of rocks, and occasionally obtaining an insecure foothold but a few inches wide. When once in the cave it is found to be divided into many rooms. The extreme height is 50 to 75 feet. The wall in front is laid in mortar, or cement, and near its uppermost part are two port holes, from which the dwellers within could obtain a view of the country for a great distance around. But few whites have ever succeeded in exploring this cave. When first explored there were found in it a few stone axes, metals and other stone implements.

The Broad Mountain Coal Beds.

The *Coal Trade Journal* says: Broad Mountain, in Schuylkill County, is the great barrier between the first and second Anthracite coal fields, and is about thirty miles in length, and four miles in width, at the Center turnpike crossing, between Pottsville and Ashland. Its high summit, 1600 feet above tide, is an immense water-shed, whence the waters drain east to the Lehigh, south to the Schuylkill, and north and west to the Susquehanna rivers. The base and main body of the mountain is composed of red shale, with a thick outer crust of conglomerate, which forms its top like the icing of a great cake. There are several depressions or valleys in its surface, of valuable importance, the principal one of which is that formed by the valley of Mill Creek, from its source, south of Mahanoy City, thence flowing westward for four miles, and then bears south on its way to its junction with the Schuylkill at Port Carbon.

Near the head of this coat-shaped coal basin, is the extensive colliery of the Middle Lehigh Coal Company, where they work the Mammoth, Skidmore, and Buck Mountain veins, which here have a capacity of 15,000 to 20,000 tons per month. The outlet of this coal to market is by a branch of the Lehigh Valley Railroad, thence down the Quakake Valley to Mauch Chunk. Two miles farther west from this colliery is the site of Old Boston. The town was removed some years ago, and now only the name and the site of an experimental shaft on the Mammoth Bed remain. The same coal bed was traced and opened on the Elie and Riehle lands, next adjoining on the west, where some time not long hence a large colliery will be located. Still further west and in the vicinity of the Mill Creek branch of the Reading Railroad, and on the lands of Messrs. Borie & Co., in the same coal basin, a slope has recently been sunk on the Buck Mountain coal bed, 145 yards in depth, on a pitch of 45 degrees south. The coal proves of good quality and ten feet in thickness. Ninety yards south of this slope the Mammoth bed has been tested and found to be eighteen feet thick, although this is believed to be but a sub-division of the main bed, whose thickness ranges from 25 to 40 feet. This, however, is a question that future developments will definitely settle. On the north dip of the same basin, yet further south, is the Altamont Colliery, sunk on what the operators supposed to be the Lykens Valley coal bed. The coal bed proved irregular in size, but now opens five to seven feet thick. It is the lowest of the coal beds, and has, therefore, the place of the Lykens Valley coal, although it does not resemble that famous red-ash coal. There are other coal basins on Broad Mountain, not yet developed and of unknown value, but there will be developments made in the near future that will open large coal deposits that future generations will bring to the surface and ship to market.



STEAM HAMMER FOR CROOKE & LIBBY, BY RICHARD DUDGEON.

numerous race. The implements consist of axes, hammers, rings, mills for grinding grain, etc.; and the broken pottery consisted of many patterns and kinds, sizes and forms, painted and unpainted, glazed and unglazed; some of which were of beautiful color and finish, the painting and glazing being apparently as fresh and perfect as when completed hundreds if not thousands of years since.

The stone implements and pottery are found in large quantities in and around the old ruins, along the irrigating canals, and scattered here and there over a large portion of the territory. In one part of the Gila Valley, for a distance of 150 miles, the whole valley is covered in places with the ruins of irrigating canals, houses, towns and cities, on both sides of the river. In places are found the outlines of reservoirs, embankments, raised plateaus, etc., and the houses and towns seem to have been laid out with due regard to the points of the compass, as though the builders had some knowledge of astronomy, or at least of the north star.

THE PAINTED ROCKS.

The author says: In traveling up the great Gila Valley, from Yuma to Tucson, many of the old ruins will be found at but little distance from the stage road. At Gila Bend, 120 miles east from Yuma, and eight miles from where the Oatman family were murdered by the Tonto Indians, in 1851, are some extensive hieroglyphics called the Painted Rocks. This mass of rock rises from the surface of the plain to a height of perhaps 50 feet, the uppermost being a broken ledge, from which masses have fallen off, and the whole covering less than an acre of land. On the standing ledge, and on the broken mass at its base, are carved deep into the surface rude representations of men, animals, birds and reptiles, and of numerous objects, real or imaginary, some of which represent chess boards, some camels and dromedaries, insects, snakes, turtles, etc.; and on the broken rocks at the base of the ledges are found on all sides, like sculptured figures, some of which are deeply imbedded in the sand. These pictured rocks present

west side 60 feet. On the north and at the northwest corner were two wings, perhaps guard or watch-houses. On the south of the outer wall was a moat that could be flooded with water from a large reservoir 50 yards to the south. Several other large reservoirs are at different points in and around the main town, which was over two miles in extent.

IRRIGATING CANALS.

A large irrigating canal runs to the south of the large building, which was from 25 to 50 feet wide. This canal took the water from Salt River, eight miles above, and can be easily traced for 20 miles or more. The people who excavated these canals must have had a knowledge of engineering, as they are cut on a true and perfect grade. Several engineers, who have surveyed canals for irrigation along the line of the old ones, acknowledge that they cannot improve the grade or gain an inch of grade to the mile.

The largest of the old irrigating canals visited and examined by the author is some 25 miles above Phoenix, on the south side of Salt River, near the point where the river emerges from the mountains. This one, for eight miles after leaving the river, is fully 50 feet wide. For this distance it runs in a southwest course, through hard, stony ground, and enters on a vast stretch of mesa, or table land, which extends south and southwest from 30 to 60 miles, having an elevation above the river of nearly 100 feet. At about eight miles from where this great canal leaves the river, it is divided into branches, each 25 feet wide, one of which runs an east of south course, one nearly south, and the third southwest, the three probably carrying water sufficient to irrigate the whole of the immense plateau of table land before mentioned.

OTHER REMARKABLE RUINS.

Two miles west of where the main canal branches are the ruins of a large town, which extends along the mesa for many miles. Near the center of this town are the ruins of the largest building yet discovered. Its ground measurement is 350 by 150 feet, with outer walls, moats, embankment, reser-

voirs is 300 feet square, and walled up on the inside 10 feet in height. On the east side of Mill Creek is another mountain top, 3000 feet above the little valley below, and on this summit there is also a walled enclosure, containing about five acres. The wall is very heavy and high, and inside it are the ruins of 24 stone buildings, from 20 to 30 feet square. The ruins of a stone causeway leading from a south spur of the mountain to the main summit can be traced for 50 yards. It is 12 feet wide, built up on the sides with boulders of a ton in weight, between which were filled in smaller stones and earth. Several miles up the Hassayampa Creek, and eight miles south of Prescott, are many ruins of stone houses; some of those in the valleys are surrounded by large pine forests, and inside the walls of one of the ruins were three large pine trees of hundreds of years growth. For a distance of 60 or 70 miles here there is a continuation of ruins of stone houses, fortifications, temples, etc., without number. A Mr. Banghart has partially excavated one of these buildings to a depth of 5 feet below the surface. The inner walls of the room were plastered, and the walls were partly of concrete and partly of stone. On the west side he found a number of large ollas, or large earthen vessels, filled with what was evidently burned or charred corn and beans. Near the southeast corner he found portions of three skeletons, one a large man, one apparently a woman, and the other of a child, and near them a water olla. They were evidently killed inside their building while defending it. A dozen stone axes and hammers were also found in excavating this room. About one mile north is a very large stone building on the summit of a hill, which was probably a temple or a fortress, also built of stone, and the stone were square dressed. Opposite Camp Verde, a short half mile on the eastern side of the river, are many large stone ruins on the bluffs overlooking the river, the walls of which are standing 20 to 30 feet high, and immense quantities of broken pottery are strewn freely over the ground. Two miles

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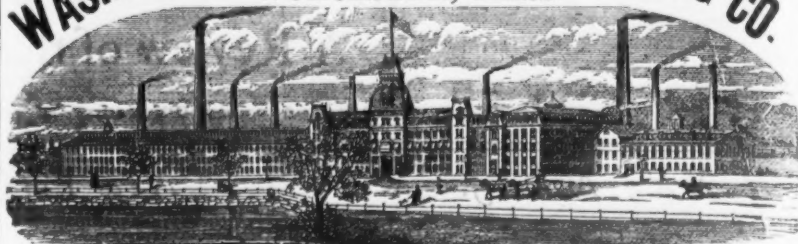
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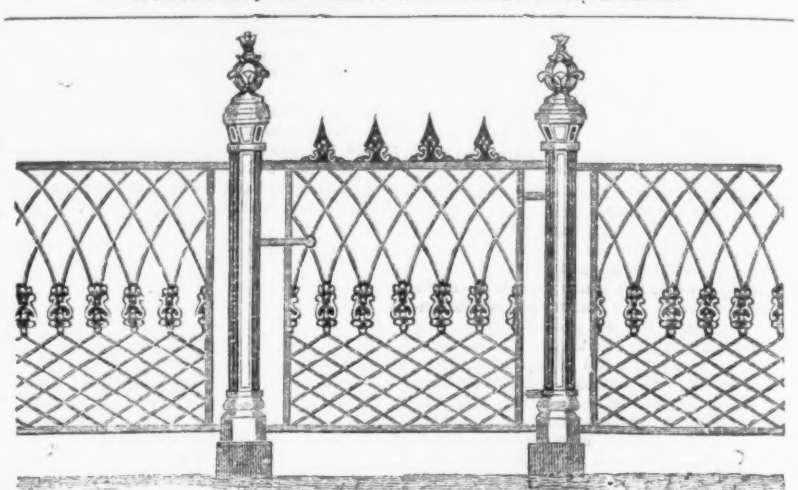


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ALBERT A. ARNOLD,

MANUFACTURER OF

Wire Cloths

STEEL ROOMS, AND CASTING BRUSHES.

AND WIRE WORK OF EVERY DESCRIPTION.

Office & Manufactory, 161 Whalley Ave., New Haven, Ct. N. Y. Agency, Patterson Bros., 21 Park Row.

ESTABLISHED 1850.

WM. HASSALL

Manufacturer of

Wire Nails

American and French

With Flat, Round, Oval, Dressed, Screw and

Fancy Heads.

Molding and Finishing Nails, with or without heads. Brush Makers', Upholster-

ers', Cigar Box, Basket, Chair and Undertakers' Finishing Nails a specialty.

Shoe Nails of Brass and Iron. Bright Iron Rivets. Brass and Iron Escutcheon

Plugs, with flat, round and fancy heads, all sizes on hand and to order.

OFFICE AND WORKS: Nos. 63 & 65 Elizabeth Street, New York.

W. S. ESTEY,

Manufacturer and Dealer in

Wire Cloths, Wire Goods and Wire

WORK of every description.

Galvanized Twist Netting for Fencing Hemmeries,

&c. Foundry Riddles and Steel Casting Brushes.

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G. Greenleaf & Co.,

WIRE WORKERS.

Wire Cloths, Foundry Riddles, Coal

Screens, Nettings, Sparkers Cloths, Iron

Railings, Window Guards. Patent Barrel

Coal Sieves, Rat Traps, and every description

of Wire Work made to order.

90 Union Street, Boston.

Geo. W. Prentiss & Co.,

HOLYOKE, MASS.,

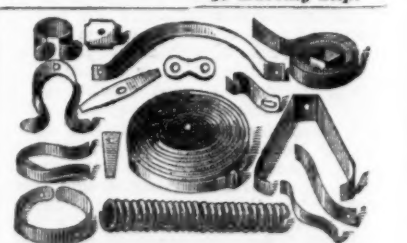
MANUFACTURERS OF

IRON WIRE.

Bright, Coppered, Annealed and Tin

Plated. Also GUN SCREW WIRE.

Of all sizes straightened and cut to order.

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Manufacturers of

Clock Springs and Small Springs

of every description, from best Cast Steel,

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TIN LINED IRON PIPE.

A pure **BLOCK TIN PIPE** within a wrought iron tube, combining Purity, Strength, Durability and Cheapness.

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Water, Air & Vacuum
PUMPS
Air Compressors.
Prices greatly reduced.
Send for circulars.
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LEWIS, DALZELL & CO.,
PITTSBURGH, PA.,
Manufacturers of



Patent DRIPPING AND BREAD PANS;
Also Cold Rolled Sheet Iron, Bar, Sheet and Tank Iron, and Nails.

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Manufacturers of
Japanese, Brass and
Silver Plated

Bird Cages.
Office & Salesroom,
No. 254 Pearl St.
Factory,
252, 254 & 256
Pearl St.,
NEW YORK.

OSBORN MFG. CO.
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BLEECKER ST. NEW YORK.

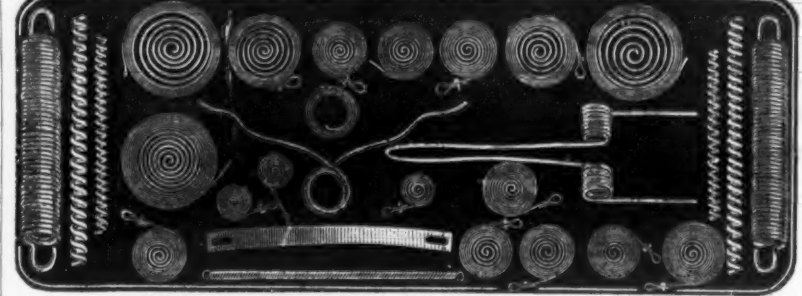
OSBORN'S METAL CAGES.
The Original Inventors and Manufacturers of the
OSBORN BRIGHT METAL CAGES.
Also OSBORN & DRAYTON Improvements under
twelve different patents. We are continually bringing
out new and beautiful designs to meet the demands of
refinement and taste.
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Manufacturer of
Patented
Bird Cages.
Japanned and two kinds
of Brass. With or without
solder.
247 & 249 Pearl St.,
New York.
Catalogue and price list
furnished on application.

S. L. SAMUEL,
Hardware Manufacturers' Agent
For EXPORT.
57 Cedar Street, NEW YORK.
Job Lots of Hardware
Bought and Sold.
Also a Full Line of Regular Goods
on hand, lower than market rates.
A. A. IRVINE,
No. 14 Murray Street, New York.
L. SALOMON,
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Merchant
IN HOUSE FURNISHING GOODS.
Agents for
Champion & Knox No. 99 Fluting Machines,
100 Chambers St., New York.

CARY & MOEN,

Manufacturers of
STEEL WIRE for all purposes, and STEEL SPRINGS of every description.



Market Steel Wire, Crinoline Wire, tempered and covered.
Also Patent Tempered Steel Furniture Springs, constantly on hand.
334, 236 and 238 West 29th Street, NEW YORK.

THE PERFECTION STOVE PIPE.

(PATENTED.)
This article is destined to revolutionize the sale
of Stove Pipe. Fifty joints of 5 in. are securely
packed in a case 10 in. square by 24 in.
long, inside, thus occupying hardly more room
than tin plate, and securing lowest rates of freight.
Entirely made by machinery, every joint is exactly
alike, and fits together with the greatest accuracy
and ease. A child can adjust it, no tools being
required. When put together it forms the strongest
and most perfect pipe in the world. Over each of
the rolls is drawn one joint of pipe to protect the
others from dirt and moisture, thus keeping it in
perfect condition always. The following are net
cash prices, viz: 5 in. per joint, 12¢; 6 in., per joint,
13¢. Other sizes in proportion, and made to order
when desired. Packed 50 joints in a crate, for
which no charge is made.
SOLE MANUFACTURERS,
The Chicago Stamping Co.
Nos. 72, 74 and 76 Lake Street,
CHICAGO.
E. C. QUINBY President. J. C. WHITING, Secretary.

ENAMELED IRON KITCHEN WARE.

(PATENTED.)
STONE-IRON WARE
Made only by the
Metal Manufacturing Company,
OFFICE & FACTORY, 708, 710, 712 N. Second Street, St. Louis, Mo.
ESTABLISHED IN 1848.

SINGER, NIMICK & CO.,

PITTSBURGH, PA.
MANUFACTURERS OF ALL KINDS OF
HAMMERED AND ROLLED STEEL,
Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL
For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives,
Cold-Chisels and Machinists' Tools generally.
SAW PLATES
For Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.
Sheet Steel
For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws,
Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL
For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.
All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface
finish and exactness of gauge.
ROUND MACHINERY CAST STEEL
For Shafting, Spindles, Rollers, &c., &c.
File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.,
Cast and German Spring and Plow Steel.
"Iron Center" Cast Plow Steel. Finished Rolling Plow Counters with Patent Screw
"Soft Steel Center" Cast Plow Steel. Hubs attached.
"Solid Soft Center" Cast Plow Steel. Agricultural Steel cut to any pattern desired.
Steel Forgings made to order.
Represented at 59 BECKMAN ST., NEW YORK, by
HOGAN & BURROWS Gen'l Agents for Eastern and New England States.

MICA.

Miners of and Dealers in MICA of all Sizes.
MICA TO ORDER IN ANY PATTERN.

As we own extensive mines at Chester, Mass., and also in North Carolina, Stove Manufacturers and
Hardware Jobbers are invited to communicate with us before contracting elsewhere.

THE CHESTER MICA & PORCELAIN CO.,
OFFICE, 87 Liberty Street, New York.

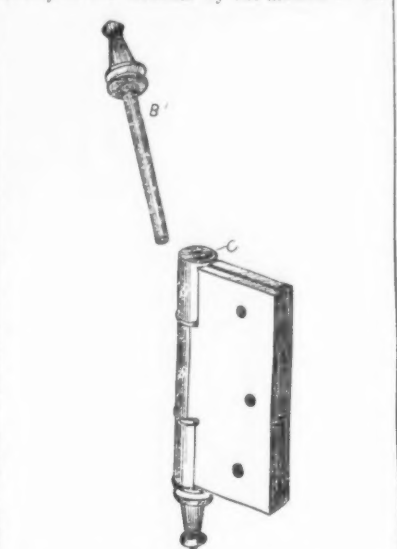
STANLEY RULE AND LEVEL CO.,
MANUFACTURERS OF

IMPROVED CARPENTERS' TOOLS.
FACTORIES, NEW BRITAIN, CONN. WAREHOUSES, 35 CHAMBERS ST., N. Y.
No. 102, Iron Block Plane, 5 1/2 inches in length, 1 1/4 inch Cutter, \$4.00 per doz.

New Patents.

We take the following abstract of new
patents, recently issued, from the official
record:

BUTT HINGE.
To Chas. B. Clark, Buffalo, N. Y.—Sept.
25.—The upper portion of the pintle, just
below the acorn-shaped tip, is provided with
a rectangular or polygonal projection, which
projection fits into and engages with a cor-
responding recess formed into the upper
knuckle section of the hinge, the construction
preventing the pintle from turning
loosely in the knuckle by the motion of the

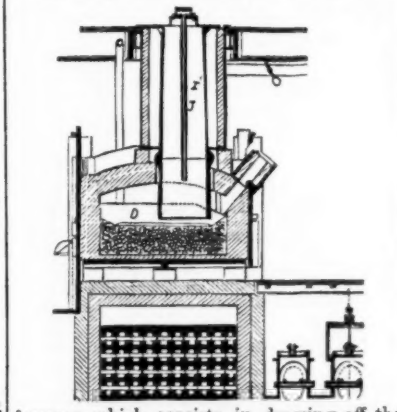


hinge, while at the same time the locking
device is entirely concealed from view.

A butt hinge constructed with a rectangular
or polygonal recess or mortise C, in the
upper knuckle section B, in combination with
a pintle B, similarly shaped below its shoul-
der, and adapted to sit and lock into said re-
cess, said shoulder being constructed of a
diameter equal to or larger than the ex-
terior diameter of the knuckle, whereby
the locking devices are concealed from
view.

METALLURGICAL PROCESSES AND FURNACES—REISSUED.

To C. W. Siemens, Westminster, England.
—Aug. 28.—Iron ore, mixed with reducing
material, is charged into the upright retorts.
Reducing gases are passed into the center of
the mass by the centrally arranged gas pipe.
The retorts are heated by some of the waste
heat from the furnace bed. The reduced
sponge drops into the bath of cast iron on
the furnace bed. Instead of upright retorts
with iron ore, may use inclined retorts, with
iron scraps, steel or broken rails, &c.
1. The process of treating the metal in
the bath of the furnace, which consists in
adding litharge or any other oxide of lead
formed into cakes or compact masses before
use, by mixing it with fused nitrate of soda
or nitrate of potash.
2. The method of preventing injury to the
furnace or the choking up of the regenerators
or flues, when oxide or lead or other sub-
stances which give off gases or vapors are
added to the molten metal in the bath of the



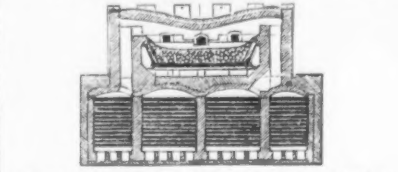
furnace, which consists in drawing off the
gases or vapors, or the greatest part of them,
from the furnaces without letting them pass
into the regenerators or flues, and then con-
densing them to recover the products.
3. The combination of one or more tubular
hoppers, I, and the surrounding heating
chamber or chambers F, with the furnace D.
4. The combination of the tube J or J' with
each of said hoppers I I'.
5. The combination of the connection M,
provided with holes and caps with tubes J
J', the said parts being arranged with the
hoppers and furnace in the manner set forth.
6. The combination of the system of heat-
regenerators with the furnace D, its tubular
hopper or hoppers, and the accessory heating
chamber or chambers thereof, F F', the whole
being made to operate together, and with
one or more gas producers.
7. In the process of making steel by a bath
of metal and one or more hoppers and heat-
ing chambers, as described, the method of
managing the circulation and escape of the
combustion products within a series of re-
generators, whereby a portion of the products
of combustion shall be withdrawn to heat the
ore, metal or material, while descending
through the hopper or hoppers into the fur-
nace or bath chamber, and the remaining
products of combustion, not reduced in tem-
perature, be caused to pass through the re-
generators to, and escape by, the chimney,
the effect being to not reduce the tempera-
ture of the furnace by the introduction of
the cool ore or materials through the hopper
or hoppers.

REGENERATOR FURNACE—RE-ISSUED.

To C. W. Siemens, Westminster, England.
—Aug. 28.—Gas and air enter through the
reversible valves and pass through the re-
generators to the furnace. The gas passes
through the smaller regenerator and air
through the larger, their sizes being propor-
tioned to the respective volumes of air and
gas necessary to insure complete combus-
tion. From these they pass up side flues to
the furnace, the air entering at a higher

level than the gas. After combustion in the
furnace bed, the products of combustion
pass down similar flues on the opposite side
through the other pair of regenerators, and
heating them intensely, pass out to the chim-
ney.

1. A regenerative gas furnace in which the
air regenerator is as much larger than the gas



regenerator as the volume of air required to
insure complete combustion is larger than the
volume of gas.

2. A regenerator gas furnace in which the
air is introduced at a level superior to that at
which the gas enters.

3. A regenerative gas furnace in which the
air flues are separated from the gas flues by a
series of partition walls.

4. A regenerative gas furnace in which both
gas and air flues are arranged above the
gas generators.

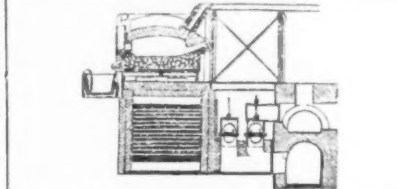
5. A regenerative furnace in which the
partition walls between the air flues and the
furnace, the partition walls between the flues
and the ventilating space, and partition
walls between the air and gas regenerators
are arranged in the same vertical plane.

6. A regenerative gas furnace in which the
tie rods are passed through the ventilating
space below the furnace bottom.

7. A ladle mounted on wheels, in combina-
tion with the regenerative gas furnace.

VALVE FOR REGENERATOR FURNACE—RE-ISSUED.

To C. W. Siemens, Westminster, England.
—Aug. 28.—Gas from the producer passes
through one valve box, past the reversing
valve, the side box, and on to the small re-
generator and furnace bed. Air passes in a
similar way through the other valve box,
&c., and large regenerator to the furnace.



The products of combustion come back
through the other pair of regenerators,
heat them, and pass to the chimney on the
other side of the reversing valve. On re-
versing this valve the courses of the air,
gas and products of combustion are also re-
versed.

1. In a regenerative gas furnace, the re-
versing valve, provided with metallic side
boxes.

2. In combination with the reversing
valve and side boxes, the mushroom throttle
valve.

194,527.—Attachment for Vertical Steam
Boilers.—C. M. Miller, Phelps, N. Y.—
Aug. 28.

Two dish-shaped disks have openings
through them, which register with each
other, so that the openings are all closed or
opened, or partially so. Said disks are
nearly equal in circumference to the smoke
box, so that when in position over the flame
tubes the smoke and gases are deflected to
the annular outer space. The smoke pipe
projects down into the smoke box, whereby
the sparks and cinders are arrested.

194,542.—Car Coupling.—J. T. Wilson, Pitts-
burgh, Pa.—Aug. 28.

194,674.—Method of Introducing Purifying
Agents into Iron.—Chas. W. Hall, New
York, N. Y.—Aug. 28.

In the purification of iron, the method of
introducing the purifying agents into or
upon the metals under treatment, which
consists in placing the purifying and convert-
ing materials in the flame of the fire-box of
furnaces when the iron is hot and near the
point of melting, whereby the draft acts as
a conveyor.

194,717.—Suspension Bridges.—R. B. Os-
borne, New Castle county, Del.—Aug. 28.

194,736.—Machine for Planing Off the Heads
and Points of Rivets.—Hiram M. Smith,
Richmond, Va.—Aug. 28.

The following trade-marks were registered
in the United States Patent Office:

5105.—Sewing Machine Needle.—William
Wilcox, Worcester, Mass.—Aug. 28.

"The symbol formed of the letters 'W.
N. Co.' stamped upon the shank of the
needles."

5164.—Emery Wheels, and Grinding Ma-
chinery in which they are used.—Edgar
C. Burgess, Westport, Pa.—Sept. 25.

"The word-symbol 'Kalmoid.'"

The following label was registered Aug.
28:

1161.—Title: "L. Coe's Mechanics' Screw
Wrench."—Loring Coe & Melvin O. Whit-
tier, Worcester, Mass.

New French Maritime Canal.—Preliminary
formalities are being carried
through at Havre, France, for the construc-
tion of a maritime canal from that port,
touching at Harfleur, and joining the Seine
at Tancarville, a point on the river about 60
miles below Rouen. By means of this canal
the dangers of the navigation of the Lower
Seine from fogs, the shifting sands, and the
violence of the tidal wave, will be avoided.
The canal will consist of a single section of
about 17 miles in length, the western outlet
of which will be in the Eure Dock, at Havre.
According to the plans adopted, the canal
would have a minimum breadth of 25 meters
(over 80 feet), with a towing path 6 meters
wide on each bank. Plans have been adopted
for increasing the depth of the channel of
the Seine between Paris and Rouen to 3 me-
ters 20 (10 1/2 feet); a minimum of 3 meters
50 has, consequently, been fixed for the
canal; and as between Havre and Harfleur
it is to be accessible for brigs, schooners and
steam colliers, the depth in that portion will
be increased to 4 1/2 meters. The cost of the
work is estimated at 21,000,000 francs, in-
cluding all accessory works, the planting of
the banks with trees, the construction of a
branch, 500 meters long, to connect the port
of Harfleur with the canal, and a basin of
500 meters by 60 meters at Havre.

Iron.
PHILADELPHIA.
**Siemens' Regenerative
GAS FURNACE.**
RICHMOND & POTTS,
119 S. Fourth St., PHILADELPHIA, PA.

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools,
Shafting & Pulleys, Steam Engines,
Pumps & Boilers, Copper, Brass,
Tin, Babbit Metals, Foundry
Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

The Cambria Iron and Steel Works,
Having enjoyed for over TWENTY YEARS the reputation of producing the best quality of

RAILS,

have now an annual capacity of

100,000 Tons of Iron and Steel Rails, Splice Bars, &c.

ADDRESS,

CAMBRIA IRON COMPANY,

No. 215 South 4th Street, Philadelphia.

Or at the Works, JOHNSTOWN, PA.

Or J. S. KENNEDY & CO., New York Selling Agency, 41 Cedar St., N. Y.

THE PHOENIX IRON CO.,
410 Walnut Street, PHILADELPHIA.

CURVED, STRAIGHT AND HIPPED

Wrought Iron Roof Trusses, Beams, Girders & Joists,

and all kinds of Iron Framing used in the construction of Iron Roof Buildings.

DECK BEAMS, CHANNEL, ANGLE AND T BARS

curved to template, largely used in the construction of Iron Vessels.

PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,

For Top and Bottom Chords of Bridges.

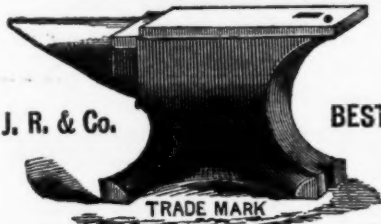
Railroad Iron, Street Rails, Rail Joists and Wrought Iron Chairs.

REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to Order.

Plans and Specifications furnished. Address,

SAMUEL J. REEVES, President.

Kensington Iron & Steel Works.
JAMES ROWLAND & CO.,
920 N. Delaware Ave., PHILADELPHIA,
Manufacturers of



**The Anvil Brand
REFINED IRON.**

Rounds, Squares and Flat Bars, Bands,
Shafts, Hoop and Horse Shoe Iron, Orals,
Half Orals, Half Rounds, Scrolls and Nut
Iron. An assortment of sizes constantly in
stock. Also Plow, Cultivator, Hoe and Shovel
Steel. Send for Price List.

PENCOYD IRON WORKS.

A. & P. ROBERTS & CO.,

Manufacturers of

CAR AXLES.

BAR, ANGLE, TEE AND CHANNEL IRON.

Office, No. 255 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

FOUNDRIY FACINGS.

GERMAN LEAD, BITUMEN, SIEVES, MACHINERY SAND,
AMERICAN LEAD, ANTHRACITE, SHOVELS, BRASS
GRAPHITE, CHARCOAL, BRUSHES, CHANDELIER
PLUMBAGO, MINERAL, CRUCIBLES, STOVE PLATE

J. W. PAXSON & CO. OFFICE & STOREROOMS, 514, 516 and 518 Beach St., Philadelphia, Pa.

The Haddock Cut Nail.

TRADE



MARK.

THE AURORA IRON AND NAIL CO.,

MANUFACTURERS OF

Sheet, Plate, Hoop, Bar Iron, Hot Pressed Nuts and Nails.

AURORA, Dearborn Co., IND.

O. P. COBB, President.

H. S. CAMPBELL, Secretary.

BLOOMS.

Cold Blast Charcoal Scrap Blooms, manufactured by

PETER OBERG & CO., Paterson, N. J.

These blooms are made by a practical Swede, who has been forging iron in Sweden for about 35 years.

**Thornton's Patent Adjustable Pipe
Tongs.**

We show in the accompanying illustration Thornton's patent adjustable pipe tongs, for which several important features of novelty and value are claimed, which will be fully appreciated by those who use such tools. The gripping edge consists of a cylindrical piece of best cast steel, which is quickly adjusted to the pipe by the thumbscrew, and which, as shown in cut, has two edges. When the edge in use has become dull, the bit can be reversed and it will be found that the friction on the lower edge has sharpened the one not hitherto used. The bits are readily removed and re-ground until worn away, when they can be replaced by any mechanic, being simply a piece of round cast steel with an obtuse chisel edge. This plan of construction entirely obviates the employment of a smith in dressing up tongs, as the work is accomplished in a few minutes on the grindstone, and they can thus always be kept in good working order. The thumbscrews have square threads and are case hardened to insure durability and prevent spreading at point, and the entire tool is



gotten up in a thoroughly substantial manner. Hancock & Maule, 243 and 245 South Third street, Philadelphia, are the manufacturers.

Driven Wells.

We have lately received several letters of inquiry asking for information as to the legal status of the United States patents, royalties, &c. As the information sought cannot well be condensed into letters, we have decided to answer these inquiries through our columns:

At the present time the whole United States patent is controlled by Messrs. Wm. D. Andrews & Bro., 414 Water street, N.Y., with the exception of the following territory. Messrs. Wm. D. Andrews & Bro. in a circular upon this subject, say: "Licenses under 'Green's American Driven Well Patent,' issued by us, to be sold by the members of 'The Pump Manufacturers' Association' and their agents, cover only 'Domestic Wells,' made after March 7, 1877. The following States, counties, and towns are excluded from the operation of these licenses, to wit:

In the State of Alabama, the counties of Talladega, Dallas and Mobile.

In the State of Arkansas, the county of Pulaski.

In the State of California, the counties of San Francisco and Santa Clara.

In the State of Florida, the counties of Jefferson, Madison, Duval and Gadsden.

In the State of Georgia, the counties of Fulton, Decatur, Thomas, Lowndes and Brooks.

In the State of Illinois, the counties of De Witt, Grundy, Will and Kane.

In the State of Indiana, the counties of Hendricks, Wayne, Morgan, Greene, De Kalb, Steuben, Hamilton, Marion, St. Joseph, Elkhart and Knox.

In the State of Iowa, the counties of Polk, Dallas, Iowa, Tama, Woodbury, Monona, Des Moines and Cedar.

In the State of Kansas, the counties of Pottawatomie and Shawnee.

In the State of Kentucky, the county of Kenton.

In the State of Louisiana, the county of East Baton Rouge.

In the State of Maryland, the county of Washington.

In the State of Massachusetts, the counties of Hampshire and Hampden.

In the State of Michigan, the counties of Jackson, Ottawa, Kalamazoo, Livingston, Shiawassee, Clinton, Ionia, Ingham, Genesee and Branch, and the towns of Tekonsha and Burlington, in the county of Calhoun.

In the State of Minnesota, the county of Winona.

In the State of Mississippi, the county of Madison.

In the State of Missouri, the counties of Barry, Dunklin, Wayne, Taney, Ripley, Stoddard, Ozark, Oregon, Newton, New Madrid and Scott.

In the State of Nebraska, the county of Burt.

In the State of New Hampshire, the county of Hillsborough.

In the State of New Jersey, the counties of Suffolk, Green, Putnam, Livingston, Ontario, Washington, Columbia, Wyoming, Cayuga and Dutchess.

In the State of North Carolina, the county of Wake.

In the State of Oregon.

In the State of Pennsylvania, the counties of Carbon, Monroe, Erie and Crawford, and the towns of Wilkesbarre and Kingston, in the county of Luzerne; Harrisburg and Middleton, in the county of Dauphin.

In the State of South Carolina, the county of Abbeville.

In the State of Tennessee, the county of Davidson.

In the State of Virginia, the counties of Warwick, Elizabeth City, Matthews, Nansemond, Norfolk and Princess Anne.

In the State of West Virginia, the county of Rockbridge.

In the State of Wisconsin, the counties of Rock, Green, Dane and Walworth.

LICENSES AND ROYALTIES ON DRIVEN WELLS.

In order not only to protect our readers from unscrupulous persons, but to prevent trouble in cases where an attempt is made to collect royalty, we publish the following circulars, which explain how royalties are collected, the precautions which the owner of the well should take to secure himself against imposition, particulars as to prices, &c.

COLLECTING ROYALTIES.

"Agents for collecting royalties are usually limited to one or more towns or a county. The royalty upon each domestic or farm

driven well, not exceeding 1½ inch inner diameter, is established at \$10. From the past royalties on such wells we allow a discount of 50 per cent., when voluntarily paid at the office of our agent within 20 days after notice in the newspapers published or generally circulated within the county limits. Parties who do not pay within the time named will be liable to the full royalty of \$10 and suit without notice. On all larger wells, and on wells used by steam or for manufacturing, public or municipal purposes, a special royalty is charged according to the capacity and uses of the well. We furnish without charge to agents a form of advertisement to be published and circulars to infringers offering a discount for prompt payment, to be filled up and distributed by the agents. Also blank license receipts bearing our signature, each for one domestic or farm well, in books containing 25 original and 25 duplicate receipts, which the agent is required to fill up with particulars that will insure the identification of the wells licensed, countersign and deliver the originals to the well owners; the duplicates, with the book, when exhausted, to be returned to us, or as we may direct. All other circulars and the necessary advertise-

ments, record books, &c., are to be paid for by the agents. Agents are obligated, by agreement, after the cessation of voluntary payments, to canvass their territory, keep a record of all wells in it and the parties infringing, and report to us all who refuse or neglect to pay. A \$1000 bond for the faithful performance of his agreement is required from each agent, to be signed by himself and a responsible bondsman. As a general rule, for cities and villages of over 2000 inhabitants, we allow 15 per cent. for collecting, and for other less compact territory, 25 per cent. Returns are required to be made as often as every 15 days. Responsible parties can lease the privileges of selling licenses and making the wells hereafter required; the prices being fixed according to value of territory."

The following gives their terms, &c., to those who wish to put down wells for themselves, or make a business of it:

"The royalty on each domestic or farm well, not exceeding 1½ inch internal diameter, has been established at \$10. We have arranged to furnish the pump manufacturers with licenses, to be sold by them at 40 per cent. discount, and no less, on condition that any party using such licenses shall, within 10 days after making a well, send to us a full description of its location, so as to insure its identification. Such licenses will not cover any well previously made, and cannot be used in any territory leased to a well driver, or belonging to other parties. To secure the making of good wells and to avoid the necessity and expenses of employing agents, we propose to issue to expert well drivers, by town or county, leases, granting the exclusive privileges of purchasing from us at a special rate of discount, licenses to drive domestic and farm wells, not exceeding 1½ inch in diameter, and of selling such licenses to others, to drive wells in said territory. The prices of these privileges will be regulated by the value of the territory leased, and will be payable in advance.

"We furnish licenses to the lessees, in books, each containing 25 licenses (by the book only and to be paid for when ordered), at a discount of 60 per cent. from the fixed price of \$10. These lessees will be obligated to construct wells in their districts at a fair price, and to issue a license with each well they make, and also to sell licenses to others when required, for use in their several districts, at a discount of 40 per cent. from the fixed price of \$10.

"To be valid, all licenses issued or sold by lessees must bear our signature and seal, and must be countersigned by the lessee of the district for which they are issued, and each must be filled up in accordance with the provisions of the license itself, in such a manner as to insure the identification of the wells licensed; and the duplicate certificate attached, so filled up, must be returned to us within ten days after the making of a well.

"As much of the success of the wells depends upon the issue of properly constructed pumps, the lessees enjoying these privileges will be restricted to the use of pumps made by some member of The Pump Manufacturers' Association of the United States.

"Larger wells used for domestic or farm purposes, and all wells used for manufacturing, steam, public and municipal purposes, will be charged special royalties, and will not be included in the leases.

"Such well drivers as will attend to and push the business, will in all cases have the preference, and changes from year to year will only be made for good cause.

"To those who wish to become agents the following directions are given for making application, and by giving the information asked much time may be saved. State age, occupation and residence. How general and extensive your acquaintance is in the county you wish to collect; whether or not you have any experience in making or using driven or other wells, in collecting royalties, or in making other collections; also, give us any other information that will enable one to judge of your qualifications for the business. Give the names of three or more business men who can be addressed for information as to your character and standing. It is well to inclose a recommendation from your neighbors. The name of the party who is to act as bondsman should also be sent, together with information in regard to his responsibility."

It will be understood that Messrs. Wm. D. Andrews & Brother control all the territory, except that which we have mentioned in the list given in another column.

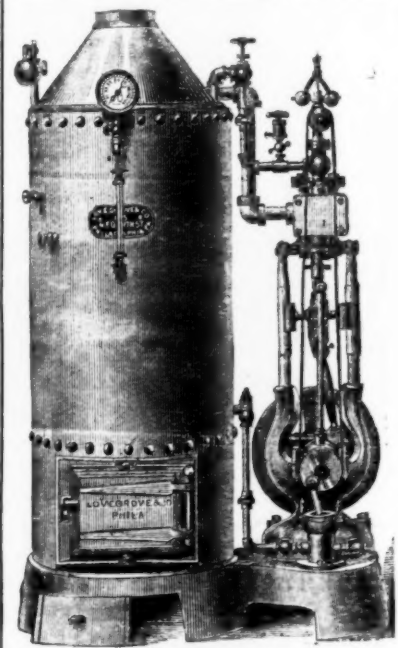
In regard to the

INFRINGEMENTS OF THE PATENT.

The firm speak in a very liberal manner. The pump companies for a long time encour-

Lovegrove's Portable Engine.

There is, probably, no direction in which competition has developed to a greater extent than in the production of small-power steam engines and boilers to facilitate the various operations carried on by our manufacturers. The effect of this continued rivalry has been to place on the market, from time to time, articles of great excellence, and to cheapen their cost. Among these, Messrs. Lovegrove & Co., No. 125 North Fourth Street, Philadelphia, claim to furnish an engine and boiler which has reached the limit of compactness, simplicity and neatness, while very durable and cheap. It occupies a floor space of only 20 by 34 inches. The boiler is 18 inches diameter and 42 inches high. It is made of the best charcoal hammered iron, which is an important item, as it is always advisable to have a reliable boiler not subject to flaws. The boiler contains 20 2-inch tubes, 30 inches long, and is tested to 200 lbs. pressure, though the working pressure is from 60 to 90 lbs. With this boiler and a cylinder 3 inches diameter and 4 inches stroke, they obtain two horse-power. The boiler is claimed to be of the best workmanship, and made of the finest material, the makers



holding it to be the best small boiler in the market. The engine is fitted with all the necessary accompaniments of pumps, valves, &c., complete. It is furnished with the Pickering governor, and the steam and exhaust connections are quite short, avoiding expense in long pipe and waste of steam. A general view of the engine is given in the accompanying cut, which clearly shows the general construction. The pulley which drives the governor affords connection for the pump at the same time. The vertical guides are bolted to the base plate, and are fitted up in as plain and substantial a manner as possible. There is a complete supply of lubricating valves, gauges, blow-off valve, &c. The fly-wheel is 12 inches diameter and 3 inches face, and insures steadiness of motion. This engine and boiler is sold for \$175, and is worthy of examination.

The following statement shows the deliveries of grain by the Erie canal to tide-water, from the opening of navigation to Nov. 14, for two seasons:

Canals opened.	1876. May 4.	1877. May 8.
Flour.....	10,427,900	9,261,500
Wheat.....	10,610,000	21,582,700
Corn.....	2,733,500	3,628,600
Barley.....	2,393,800	3,448,100
Rye.....	707,800	1,009,100
Malt.....	655,900	554,500
Total bush.....	27,529,900	40,871,500

It is estimated that the total this year will reach 50,000,000 bushels by the close of navigation. Receipts at Montreal from January 1 to November 15 ult., 12,977,400, a slight decrease from last year.

We read in a report of the English Polytechnic Society's fair, that the Phosphor-Bronze Company obtained a first-class silver medal for a large collection of exhibits illustrating the various uses to which this invaluable alloy can be and is put. Phosphor-bronze is a compound of tin, copper and phosphorus in certain proportions, according to the special work required. Among the exhibits were several bearings that had been in constant use for long periods without appreciable injury, and a plunger that had been in operation 572 days without giving any evidence that it had been in work at all. Few better illustrations of the wear-resisting properties of phosphor-bronze could have been afforded.

Iron.

TAYLOR IRON.

Unequaled for
Strength, Soundness and Uniformity,
and Capable of Receiving the
Highest Finish.

Orders executed from store with immediate dis-
patch.

RANDALL & JONES,

Sole Representatives in the United States
and Canada,
No. 10 Oliver St., Boston

BOSTON ROLLING MILLS

Manufacture
Extra quality small Rods, from best selected Scrap Iron
SWEDISH AND NORWAY SHAPES,
Nail and Wire Rods. Also,
Horse Shoe Iron, Hand Made
Horse Shoes & the Boston
Horse Shoe.
BOSTON ROLLING MILLS, W. B. ELLIS, Treas.
Office, 17 Battery March St., Boston.

BRADLEY, REIS & CO.,

NEW CASTLE, PA.,

Manufacturers of every description of

PLATE & SHEET IRON

OFFICE, at Works.

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COMMISSION AGENTS,

PIG IRON

Blooms, Bar, Sheet & Hoop Iron.

917 N. Third St., St. Louis.

THOMAS J. POPE & BRO.**BORAX**

Of Finest Qualities. METALS.

292 Pearl Street, near Hookman, N. Y.

Anthracite, Charcoal and Scotch Pig Irons, Ingot
Copper, Lead, Bismuth, Tin, Antimony, Aluminum,
Spelter, Nickel, &c., &c.

BORAX.

Concentrated Borax in sacks.
Selected concentrated Borax in barrels.
Refined Borax in cases.
Pulverized Borax in barrels.
Pulverized Borax in pound and half pound packages.
Being Sole Agents for Messrs. Smith Bros., OWNERS OF
THE MINES, we are enabled to sell at the lowest prices.

W. F. COLEMAN & CO.,

NEW YORK, 120 Pearl Street.

SAN FRANCISCO, CAL., cor. California and Front Sts.

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PRACTICAL MAKERS OF PLAIN AND ORNAMENTAL

PATTERNS & MODELS

OF WOOD AND METAL OF EVERY DESCRIPTION

PATENT OFFICE MODELS &c. &c.

MANUFACTURERS OF MALLEABLE IRON SPECIALTIES & HARDWARE.

The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays,

Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

J. BLODGET BRITTON.

This laboratory was established in 1866, at the in-
stance of a number of practical Iron Masters, ex-
pressly to afford prompt and reliable information
upon the chemical composition of the substances
above mentioned, for smelting and refining pur-
poses. The object being to make it at once a con-
venient, practically useful, and comparatively in-
expensive adjunct to the Furnace, Forge and Rolling
Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in
an ordinary Ore. \$4.00

For the per cent. of Pure Iron, Sulphur and
Phosphorus in do. 12.50

For each additional constituent of usual oc-
currence. 1.50

For those of unusual occurrence or difficult
to determine, the charge must necessarily
depend upon circumstances.

For determining the per cent. of Sulphur and
Phosphorus in Iron and Steel. 14.00

For each additional constituent of usual oc-
currence. 6.00

For the per cent. of Carbonate of Lime, and
insoluble Silicious Matter in a Limestone. 10.00

For each additional constituent. 2.00

For the per cent. of Water, Volatile Combust-
ible Matter, fixed Carbon, and Ash in Coal. 12.50

For determining the constituents of a Clay, Slag,
Coke, or of an Ash in Coal the charges will cor-
respond with those for the constituents of an ore.

For a written opinion or letter of instruction the
charge must necessarily depend upon circum-
stances.

Printed instructions for obtaining proper average
samples for analysis furnished upon application.

W. R. OSTRANDER,

Manufacturer of

Patent Speaking

Tube Whistles.

Cast Bronze Whistles for
first-class work. Price on
application.

10 Ann St., New York.

GEORGE W. BRUCE.

MANUFACTURER OF

Best of CEMENT & MASONRY

Great improvements offered in their superior Shovels,
spades and Scoops and Truvels, as well as hoes. A
wide stock on hand.

Iron.

CLEVELAND ROLLING MILL CO.,

Manufacturers of

Bessemer Steel & Iron Rails & Fastenings,

SPRING STEEL AND WIRE of all kinds,

STEEL HORSE SHOES, TIRE, AXLES & other Forgings.

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All made from our own Lake Superior Ores.

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Agents for the UNION STEEL SCREW CO.

WHEELS AND AXLES
MADE OF THE
BEST STOCK
AND IN THE MOST
careful
MANNER
FURNISHED
SEPARATELY
OR "FITTED"
MAKING
COMPLETE
SETS

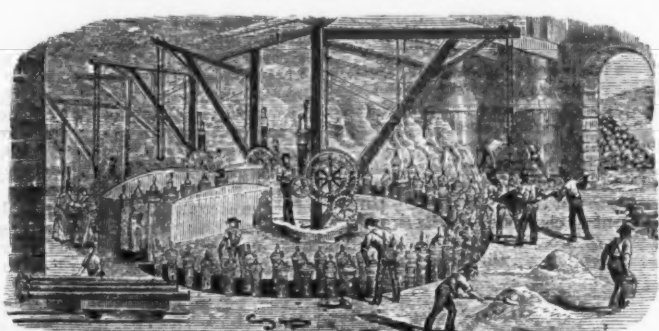
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R.R. NEW JERSEY
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CAR WHEELS & AXLES

STEEL TIRED WHEELS
MADE UNDER
SAX & KEAR'S
PATENT
FOR LOCO TRUCK
(AND TENDER)
PASSENGER CAR
SERVICE.

DRAW HOOKS & FORGINGS.
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Manufacturers of and Dealers in

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Tubes, Wrought Iron Steam and Gas Pipe.

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Light Castings and Metal Patterns

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Will make estimates on completed work when desired.

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Manufacturers of all grades of

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TIN AND TERNE PLATES, made with Natural Gas as fuel.

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WORKS, Leechburg, Pa.

NORTHWESTERN**HORSE NAIL CO.**

ESTABLISHED IN 1862.

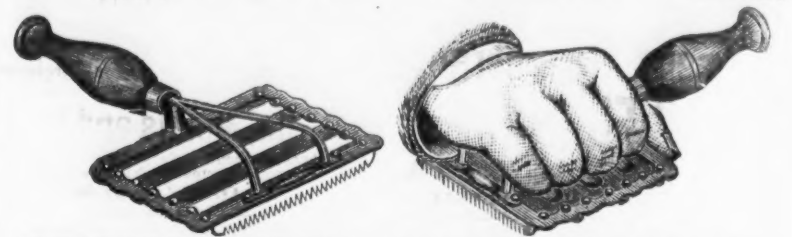
Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal
in the market. It is the genuine "Northwestern" Nail. Finished, and we give it
our unqualified guaranty.

Office and Factory, 56 to 68 Van Buren St., Chicago.

A. W. KINGSLAND, Secretary.

Our agents, Graham & Halstead, 113 Chambers Street, New York, carry a full
list of our goods, and will be pleased to serve you at Factory prices.

HOTCHKISS' PATENT "SUPERIOR" COMB.

We invite the special attention of the trade to our Patent "Superior" Curry Comb, which is the best and
most complete side handle Comb having a grasp over the back now in existence, and which for neatness, strength
and durability has no equal. Give them a trial and you will be convinced that they are Superior to any Curry
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Parallel Bench Vises, Bench Screws, Vice Screws, Box Chisels, Hives,
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ONE-HALF SIZE.



Also the ELECTRIC AND FAMILY KNIFE SHARPENER.

CHAMPION BARROWS.

WITH WOOD OR IRON WHEELS.
A first-class article and a specialty, that will make a demand in any market and afford a good margin
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Shattuck's Union and Counter Scales.
Phelan's Axes, Hatchets, Picks, &c.
Wellman's Gimlet's, Gimlet Bits, &c.
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Pointed Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and
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After more than Fourteen Years of Competition

McCaffrey's Philadelphia Hand Cut Files and Rasps
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Silver Medal.



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FORGED

**Hammer Pointed
HORSE SHOE NAILS.**
READY FOR DRIVING.

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and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
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AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,

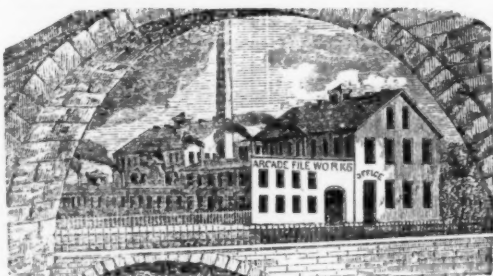
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

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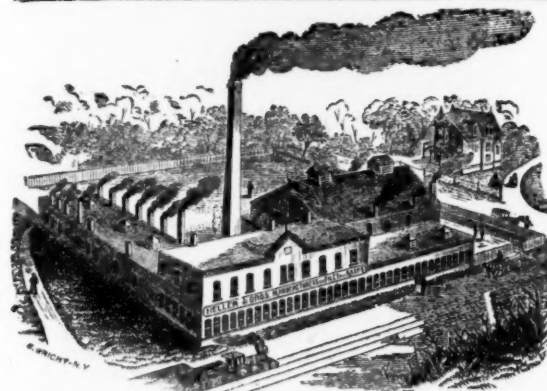
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Manufacturers of SUPERIOR
HAND CUT



FILES AND RASPS
Made from Best
ENGLISH CAST STEEL.
Quality guaranteed by written warranty
when required.



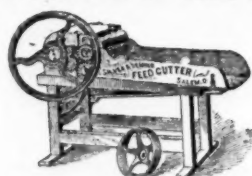
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Manufacturers of
**Best American Hand
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Guaranteed to give entire
satisfaction.

For sale by all leading Hard-
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The Silver & Deming Feed Cutter
HAS NO SUPERIOR IN THE MARKET.



Celebrated for its great capacity, ease of running and its adaptability to all kinds of work. Our power Cutters are fitted with an Improved Safety Fly Wheel, and in the event of iron or other hard substances getting into the feed the Fly Wheel revolves but the Knives stop, thereby securing safety to the Machine and to the operator.
Send for circulars giving Prices and full Particulars.
Liberal discount to the trade.

SILVER & DEMING MFG. CO.,
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**GOLD MEDAL
Non-Extensible Razor Belt.**

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873 and JUNE 9, 1874.

In this Strap the flexibility of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it will, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER & SON, Manufacturers,

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Scroll Saws

SAW BLADES,

WOOD, DESIGNS AND
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FLOWER POT BRACKETS,
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S. H. & E. Y. Moore, Anti-Friction Barn Door
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Send for prices and specialties.

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Solid Cast Steel Pump Augers

Solid Cast Steel Augers & Reamers

For Boring PUMP LOGS. All sizes in stock.

Socket Shanks, Ring Handles, and Connecting

Rods for the above to order. Also Trenching Tools

for joining logs. Coopers' and Slaters' Tools.

Tool Chests. Tools for all trades a specialty.

JOSEPH THOMPSON,

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STEERING APPARATUS,

For Steamships, &c., made and fitted up.

Iron Pumps Reamed & Ho-Chambered.

Also, Patent Pressed Pump Leathers, Galvanize

Iron Hanks, Oars, Mast Hoops, Hanks, Belay

Pin, Hand Spikes, Capstan-bars, Hand Pumps, &c.,

and every article appertaining to the trade, of the

best material. General dealer in Lignumvire.

HEADS POLISHED AND LACQUERED.

PAT. MAR. 31, 1874

MAL-LEABLE IRON AXE

WEDGE

NEATLY PUT UP IN DOZ WEDGES AND

CHOCOLIC CIRCULAR IN EACH BOX

MANUFACTURED ONLY BY

AMERICAN SLEIGH

AND CARRIAGE IRON CO.

BOSTON MASS.

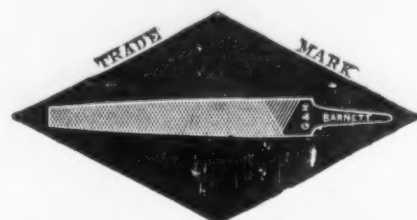
Price, \$4.50 per gross; one sample by mail, 10 cents;

one each size (three sizes) by mail, 20 cents; one dozen by

mail, 60 cents. For sale by wholesale dealers in

Boston, New York, Philadelphia, Chicago and St. Louis.

Black Diamond File Works.



Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."

G. & H. BARNETT,

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ESTABLISHED IN 1816.

NO CONNECTION WITH ANY OTHER HOUSE.

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AGENTS for the American Screw Co.'s Machine Screws and Taps.

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IMPORTERS OF STUBS' Files, Tools, Steel Wire.

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DEALERS IN Scroll Saw Machines, Bracket Saws, Wood and Patterns.

CHARLES B. PAUL,
Manufacturer of HAND CUT FILES.

Warranted CAST STEEL. 187 Tenth Street, Williamsburgh, New York.

All descriptions of Files made to order. Price List mailed on application. Established 1863.

AUSABLE HORSE NAILS
POLISHED OR BLUED.
HAMMERED AND FINISHED



The Ausable Nails

Are Hammered Hot,

And the Finishing and Pointing are
Done Cold,

Thus Imitating the Process of Making Nails by Hand.

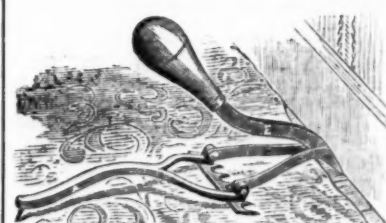
Quality is **Fully Guaranteed.**

For Sale by all Leading Iron and Hardware Houses.

ABRAHAM BUSSING, Secretary,
35 Chambers St., New York.

BULLARD'S PATENT CARPET STRETCHER.

Patented June 13th, 1876.



The Best Thing ever made for
Laying Carpets.

It is light but durable, simple in construction, and powerful, as it has a short fulcrum and good length of lever, which makes it easy to operate, and is warranted not to injure the finest carpet. It holds the carpet in position after it is drawn to its proper place, thus giving the operator the free use of both hands with which to do the nailing. The lever, E, is then folded back and down upon the push bar, A, so it will be entirely out of the way while the carpet is being nailed. No person using one once will be without one. It needs only to be seen to be appreciated.
For Utility it defies competition.

MANUFACTURED BY

The Cowles Hardware Company,
UNIONVILLE, CONN.

BAEDER, ADAMSON & CO.,
Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

(Also, in Rolls for machine work.)

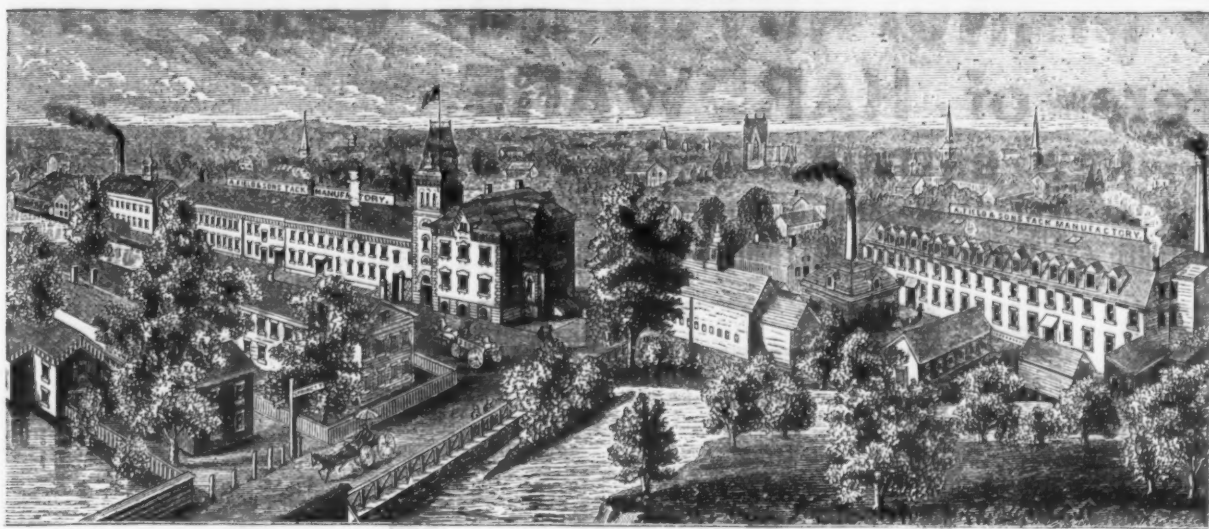
Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-

ing for Covering Boilers, Pipes, &c., Cow Hide Whips

Stores: PHILADELPHIA, 230 Market St., BOSTON, 143 Milk St.,

NEW YORK, 67 Beekman St., CHICAGO, 183 Lake St.

A. FIELD & SONS, TAUNTON, MASS.



MANUFACTURERS OF

TACKS OF ALL KINDS.

Shoe Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

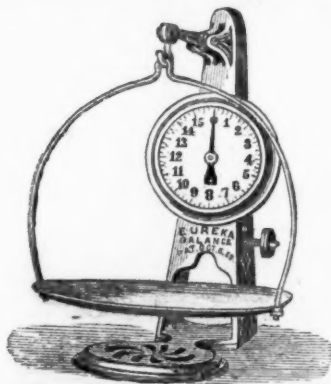
OFFICES AND FACTORIES AT TAUNTON, MASS. WAREHOUSE AT 78 CHAMBERS STREET, N. Y., where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from samples to order.

Hoisting Machinery
Manufactured by
Crane Bros. Mfg. Co.,
CHICAGO.

COOKE & BEGG, Agents, 16 Cortlandt Street, New York.

Eureka Self-Adjusting



SCALES.

Have a patented attachment for ascertaining the tare of a dish or other receptacle used in weighing without the use of weights or loss of time.

Manufactured only by

JOHN CHATILTON & SONS,
91 & 93 Cliff St., New York

HARKINS & PRAY,

Bristol, Pa., Manufacturers of



The Ball Tye Iron
AND
TIRE BENDERS.

FINE GRAY IRON CASTINGS of all kinds made to order.

Oldest and Largest Establishment of the kind in the U. S.

F. L. & D. R. CARNELL,

844 Germantown Avenue, Philadelphia

Manufacturers of Pennsylvania Brick Machine, Little Giant Pipe Machine, Fire and Red Brick Presses, Clay Wheels, Tile Machines, Stampers, Grinding Pans, Brick Yards fitted out for running by steam or horse. Heavy and Light Castings. Send for circular.

PRIZE MEDALLISTS:

London, 1862; Oporto, 1865; Dublin, 1865; Paris, 1867; Moscow, 1872; Vienna, 1873; and only Award and Medal for Self-Coiling Steel Shutters at Centennial Exhibition, Philadelphia, 1876.

CLARK & CO.,

ORIGINAL INVENTORS AND SOLE

PATENTEES OF

Noiseless Self-Coiling Revolving
STEEL SHUTTERS,
FIRE AND BURGLAR PROOF.

Also Improved

Rolling Wood Shutters

Of various kinds. Clark's Shutters are the Best and Cheapest in the world. Are fitted to new Tribune Building, Lenox Library, Delaware and Hudson Canal Co.'s Building, Transatlantic Steamship Co.'s new Dock, American News Office, &c., Post Office Court House, Mt. Vernon, Holt County Court, Oregon, Mo. Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c. Have been for years in daily use in every principal city throughout Europe, and are introduced by the Leading Architects of the World.

Office and Manufactory,

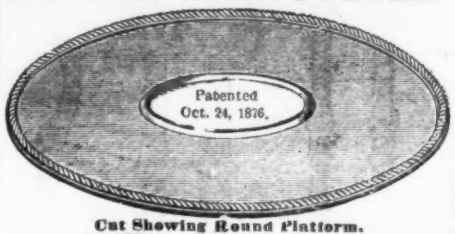
162 & 164 West 27th Street, N. Y.

ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the

Ansonia Brass & Copper Co.

Office, 19 & 21 Cliff Street,
NEW YORK.



Cut Showing Round Platform.



Section Showing Edge.

ANSONIA
Bronzed Fire Screen,
With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or Shield, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat. Being constructed of metal, with firm and substantial edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a grate or fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.



To the Hardware Trade.

A General assortment of

HARDWARE

For the country trade constantly on hand.

JOHN L. BROWER & SON, 288 Greenwich Street, New York.

JOWETT'S HORSE RASPS, 16 IN.

Agents for Mahany's No. 1 Tire Shrinker. Send for Circular.

L. BAILEY'S POCKET BLOCK PLANE

We desire to call special attention to our New JOINTERS' POCKET BLOCK PLANE. We believe this tool when once seen will speak for itself more pointedly than anything we could possibly say. It is simplicity itself, both in construction and operation, and the nicest working tool ever made, and specially recommended for amateurs, pattern makers, light scroll saw work, etc., etc.

No. 12, 4 1/4 in. in length, 1 1/4 in. cutter, japan'd finish, polished trimmings.....	each.....	7 doz. \$10.00
No. 12 1/2, 4 1/4 in. in length, 1 1/4 in. cutter, japan'd finish, nickel-plated trimmings.....	1.00	12.00



Send by mail, postage paid, on receipt of price. Patented October 9, 1877.

Send for Illustrated Catalogue and Price List.

Manufactured by

LEONARD BAILEY & CO., Hartford, Conn.

Horse Clipping Machines.

Price \$5.00.



Orders filled by
mail. Postage 25
cents extra.

Liberal Discount
to the Trade.

Are carefully made, and are of such a quality and form as to work with smoothness, thus avoiding altogether the usual irritation attending the shearing of horses.

BROWN & SHARPE MFG. CO., Providence, R. I.

Effects of Heat upon the Fire Sheets of Boilers.

Iron plates made from the piling and rolling of bars are not unfrequently laminated from imperfect welding, caused mainly by small particles of scoria which intervene between the laminated surfaces. When such plates are subjected to a high temperature on one side, as in the case of fire sheets in steam boilers, the defect is manifested by blisters of greater or less extent, and of a thickness corresponding to the thickness of the outer lamina. In some instances three and four distinct laminæ are found, which are usually called so many "leaves." The outer surface of the fire sheets of a boiler is subjected to a temperature of upward of 1200 degrees; while the inner surface, protected by the boiling water, will be from 212 degrees to the temperature resulting from the pressure of steam in the boiler. It was formerly put at 212 degrees, but inasmuch as the steam generated at the surface is constantly passing up through the water into the "steam room" of the boiler, where the accumulated and superincumbent pressure is increasing in temperature, it is fair to estimate the temperature of the inner surface of the plate at least as high as the temperature due to the pressure of steam. We will suppose that a boiler is running at a pressure of 60 pounds per square inch. The temperature due to this pressure is about 295 degrees. It will be seen from this that the difference in temperature of the outer and inner surfaces of the plate is some 950 degrees. Now, if the plate is imperfect or laminated, the greater expansion of the exterior surface will cause it to rise up in blisters.

From the foregoing it is evident that blisters are occasioned by a want of solidity and homogeneity in the iron. If the bars which form the pile are clear and free from rust or scoria, and are well welded in the process of rolling, the great difference between the temperature of the two sides produces, apparently, no injurious results. When the heat of the furnaces impinges against the fire surfaces, if the plates are solid and homogeneous, and the boiler free from scale, the thermal conduction is complete; but, on the contrary, if the sheet is laminated, resistance is offered to the conduction of heat, and the outer surface, being overheated, rises up in the form of a blister. Any obstacle intervening to prevent the free conduction of heat results in overheating the part between the fire and the intervening obstacle. Hence, if scale accumulates on the inner surface of the boiler, so as to prevent the water from coming in contact with the metal, the iron is liable to be greatly overheated and its strength much reduced. The outer lap of fire sheets are often found fractured from the rivet holes out to the edge or in the line of the rivet holes. This is caused by the outer portion being overheated, in consequence of the resistance offered to the free conduction of heat. The two plates coming together act in the same manner as a laminated sheet, except that at the joints they are so bound together, and the lap is comparatively so short, that instead of bulging, as in the case of a blister, the iron becomes fractured and worn away. Therefore, an externally-fired boiler should be so constructed that the first sheet should overlap the second. This will prevent the flame from impinging against the edge of the sheet, and diminish, in some measure, the danger of rapid deterioration. The longitudinal seams should be well up on the sides of the boiler, beyond the action of the fire.

Careful examination of boilers which have been long in use will generally show a thinning down of the plate at the outer lap. This may be in some measure due to impurities in the coal, but it is also due to the impediment offered to the free conduction of heat, in consequence of which that portion of the sheet is overheated and worn away. It will be noticed, in connection with boilers of considerable age, that the rivet heads in and near the furnace are much worn away. This arises from the fact that they derive little protection from the water within the boiler. The heads being riveted down and projecting beyond the edge of rivet hole, present the same resistance to thermal conduction that laminated sheet and overlaps do, only that this difficulty is in addition to the others, and the result is more manifest and more easily detected. It must not be forgotten that impure coal is an active agency in this wearing process. The question has been asked, "How thick can iron be and not be injured by a fire on one side while there is water on the other, as in the case of a boiler?"

From the foregoing it will be seen that the homogeneity of the iron, freedom from scale on the inner surface of the plate, and character of fuel, have much to do with the solution of this question. Formerly it was a difficult matter to roll boiler plates of one-half, or three-quarters of an inch thick, free from laminations, which had much to do with their increased resistance to thermal conduction. The difficulty now, however, is mostly overcome, and the process of rolling plates from ingots of soft steel gives a product of almost perfect solidity and homogeneity, and one which offers the least resistance to the transmission of heat. It is nevertheless true, that the evaporative efficiency of a boiler depends largely upon the thickness, as well as upon the nature and condition of the material forming the heating surface. In a homogeneous plate, the resistance to the conduction of heat is directly in proportion to the distance which the heat has to travel, or to the thickness of the plate, and inversely to the difference of temperatures between the inner and outer surfaces.

From experiments which have been made with new boilers, constructed of one-half and three-eighths inch plates, the steaming qualities have been found in favor of the thinner plate at first, but when the plates have become coated over with layers of oxide on one side and scale and grease on the other, the difference in efficiency is not apparent. It is believed by many engineers that there is a gradual diminution in the thinness of boiler plates by the action of heat until they are about five-sixteenths of an inch, which seems to be the thickness

that will transmit heat with just the rapidity that will keep the fire surface below a wasting temperature. This is said to have been particularly noticed in connection with railroad locomotive boilers. In our own experience we have found that the fire sheets of externally fired boilers of great age are very perceptibly thinned, even where the original thickness was not more than one-quarter or five-sixteenths of an inch. Portions of the boilers now acted upon by the fire showed none of the wearing-away process. How much the thinning may have been due to impure fuel cannot be positively stated, but such facts as could be gathered indicated that a good quality of fuel had been used. Some of these boilers were thirty years old. Strips were cut from the fire sheets and tested as to their condition and strength. In some cases these would be found soft and ductile, and apparently little injured in quality by the long use to which they had been subjected. In others the structure had become crystalline, and the fracture was short and the metal brittle.

The fire sheets of boilers are so often renewed after a few years' use, it is difficult to get reliable data bearing upon the long-continued action of heat upon iron plates. There is little doubt that the steaming qualities of a boiler constructed of quarter-inch iron would be superior to one constructed of half-inch iron; and it might further be said, that one constructed of one-eighth inch iron would be better than either, from the fact that there would be less resistance to thermal conduction. But it must not be forgotten that the construction of boilers often involves the use of metal not only one-half inch, but even three-quarters of an inch, and in rare instances one inch thick, in order to withstand the internal pressure, and provide at the same time a good margin for safety.

The conclusion would seem to be that there is no definite thickness of plate that will transmit heat with just the rapidity that will keep the fire surfaces below a wasting temperature, or, if there is such a thickness, it is next to impossible to ascertain it, on account of the difficulties with which the use of boilers is surrounded in consequence of imperfect metal, impure water and fuel impregnated with extraneous substances.

J. M. ALLEN,
Office Hartford Steam Boiler Inspection
and Insurance Company,
HARTFORD, November 14, 1877.

The Tennessee River Improvement.

The Chattanooga Dispatch says: To say that the Tennessee river, even in its present ligatured and half efficient state, is an immensely important commercial factor for the up-building of the cities and towns on its banks, would be to utter a truism which will appear stale and trite to those who are not residents of those localities. Yet it is a fact which cannot be too often impressed upon the citizens of Chattanooga and her sister cities of the immediate river valley. They are altogether too apt to get in the way of thinking "it will all come right in time, and according to the due course of progress and law; meantime we must get on as best we may with the make-shifts we have provided." This dawdling has postponed the work of opening the river for years. The presence here this morning of the large delegations from all quarters of the country immediately interested in this matter, shows there has been a re-awakening of our most intelligent and enterprising people upon the important commercial and industrial results to flow from a prompt opening of our great natural highway of trade.

Let us use this city to illustrate the two points we hint at above. The grain trade of Chattanooga without the river would be nil. It is all borne to her from the upper Tennessee and its tributaries. Since 1873 this trade has amounted to something more than twelve hundred thousand dollars annually. It is constantly and rapidly growing. As we have said, it would be almost nothing without the river. Had the grain-growing region to depend on the railroads it would go through here, just as grain from Louisville, St. Louis and Chicago would, to Atlanta and Macon, and the other cotton-belt cities; our merchants would not handle a pound of it. If we add to the grain which comes here by river, the ore, pig iron and other miscellaneous merchandise, we shall have a total trade of fully \$1,500,000 per annum. Then there is lumber and wood-working trades generally, just in their infancy. This year one firm will cut about 4,000,000 feet, and will manufacture a large amount of this into furniture of various kinds. This is a mere nucleus of this branch of trade which is already reaching out into every part of the South, and does a good deal of business with the Eastern cities. The timber above us is abundant for a lumber campaign of 30 years. This is the natural supply point for lumber, doors, sash, blinds, bedsteads, cheap and fine furniture, for a large scope of country, and in spite of transportation difficulties and discriminations we are realizing a large Eastern and Southern lumber trade. So much for the up-river trade.

Suppose now that our grain, iron, coal, lumber and manufactured articles generally had free sweep by water from here to the Gulf of Mexico. What should we gain as a commercial center if we could make direct exchange of these supplies for the cotton of all the towns 100 miles below Bridgeport, and could supply pig iron and other heavy articles by cheap water transportation to Paducah, Columbus, Memphis, Vicksburg, Natchez, Baton Rouge and New Orleans, and realize the benefits of the reflex of trade, such connection would bring about? Some idea of the advantages to be gained through an open river hence to New Orleans, may be realized by considering first what we should lose were our up-river business to suddenly dry up, and then that this trade could and would readily be doubled if the Shoals were opened. To dry up the Tennessee above us would be to dry up Chattanooga. To open up the Tennessee below us would double our commerce in five years, and greatly increase, not only our own population, but add immensely to that of the whole valley, as well as to its wealth.

RUSSELL & ERWIN MANUFACTURING COMPANY

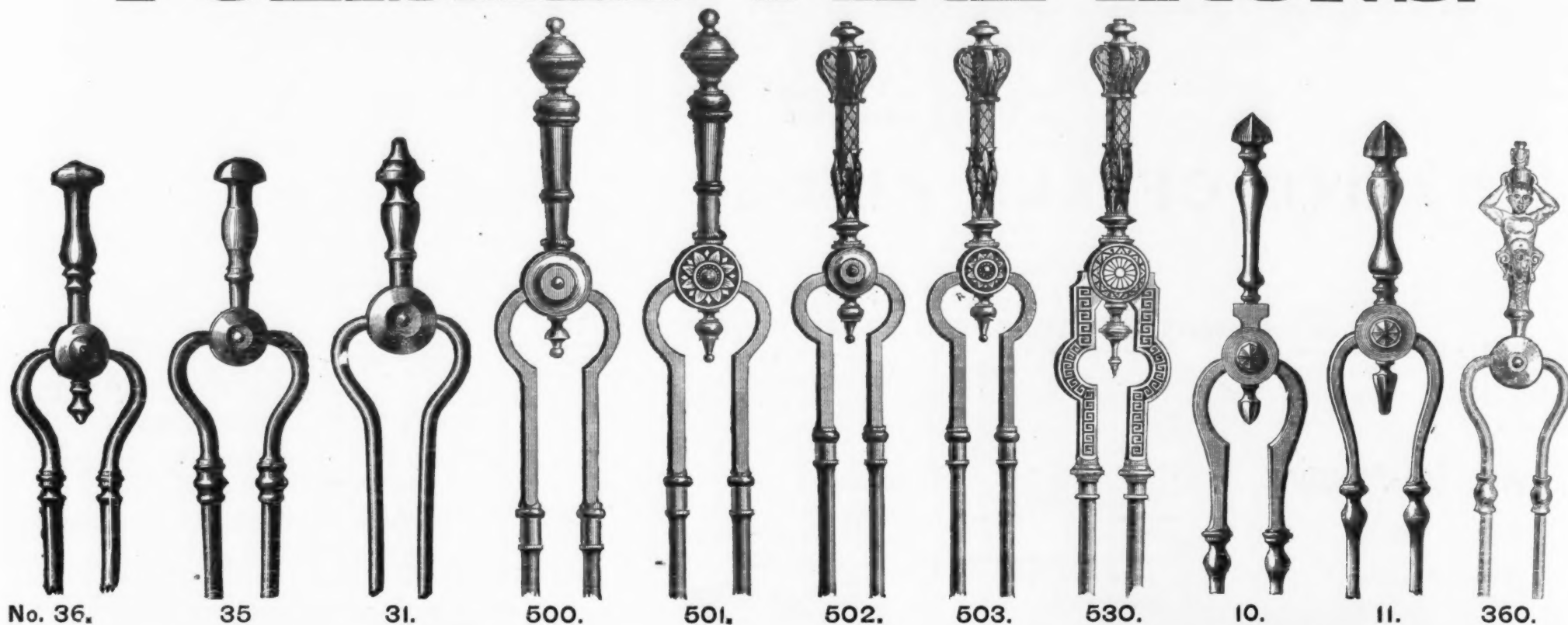
Manufacturers of **HARDWARE.**

FACTORIES, - - - NEW BRITAIN, CONNECTICUT, U. S. A.

MANUFACTURERS' AGENTS AND DEALERS IN GENERAL HARDWARE AT OUR

WAREHOUSES: NEW YORK, 45 & 47 Chambers Street; PHILADELPHIA, 425 Market Street; BALTIMORE, MD., WM. H. COLE. Agent, 17 South Charles Street.

POLISHED FIRE IRONS.



No. 36.

35

31.

500.

501.

502.

503.

530.

10.

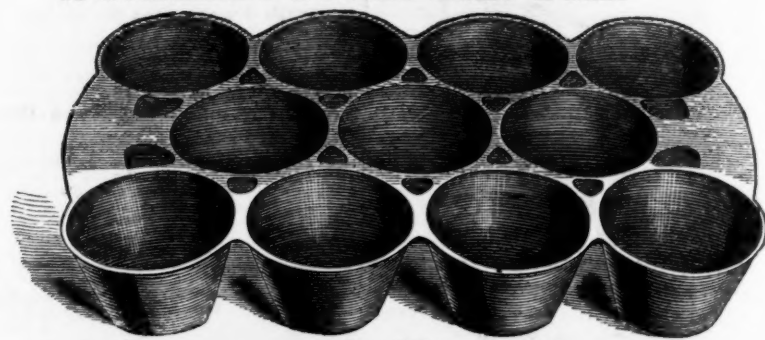
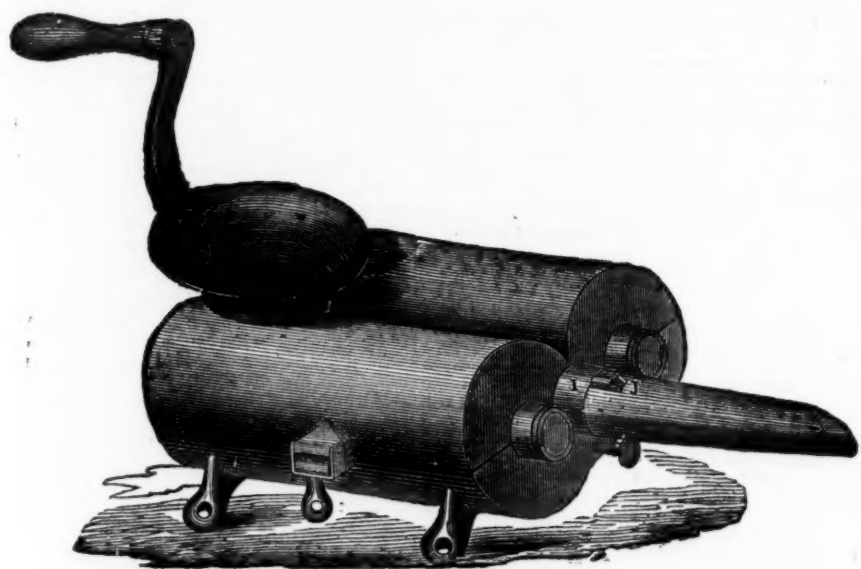
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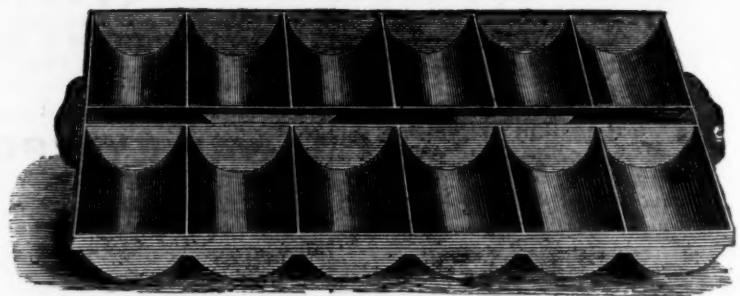
Hale's Patent Meat Cutter.

Coal Tongs.

Waterman's Patent Bake Pans.



No. 10.



No. 11.

DOOR LOCKS, KNOBS, Etc., in great variety.

Full line of RIM AND MORTISE LOCKS with PATENT ALL STEEL NICKEL PLATED KEYS, at Reduced Prices.

PADLOCKS.

CABINET LOCKS.

R. & E. MFG. CO. WOOD SCREWS.

Complete Assortment at the lowest market rates. Also a full line of GENERAL HARDWARE. See Vol. 3.

Sole Agents for the

DOUGLASS MFG. CO., JAMES SWAN, Successor,
AUGERS, BITS, CHISELS, DRAWING KNIVES, Etc., Etc.

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of PEN AND POCKET CUTLERY.

Solid Steel Scissors, Shears, Razors,
Russia Leather Strops, Hones, &c.

Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"

And the "ELECTRIC SHEARS." Nickel Plated
celebrated "ELECTRIC SHEARS." Nickel Plated
Howe.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

MERIDEN CUTLERY CO.

The Oldest Manufacturers of Table Cutlery in America.

The "PATENT IVORY" HANDLE TABLE KNIFE.

EXCLUSIVE MAKERS OF THE

PATENT IVORY

Or CELLULOID KNIFE. The handsomest and most durable substitute for Ivory known. Also makers
of all kinds of TABLE, BUTCHER AND HUNTING KNIVES.
Illustrated catalogues with prices sent to the trade on application. 49 Chambers St., New York.

The Miller Bros. Cutlery & U. S. Steel Shear Co.'s "Consolidated."

Centennial Award for best Quality and Finish.



Pocket Cutlery and Solid Steel Shears and Scissors.

J. C. WILSON & CO., 81 Beekman St., New York Agents.

E. L. COOPER, 48 Warren St., New York Special Agent.

THE MILLER BROS. CUTLERY CO., West Meriden, Conn.

NAUGATUCK CUTLERY CO.,

Manufacturers of FINE PEN & POCKET CUTLERY.

FULLER BROS., Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

HALL, ELTON & CO.,

Electro Plated Ware, German Silver and Britannia Spoons.



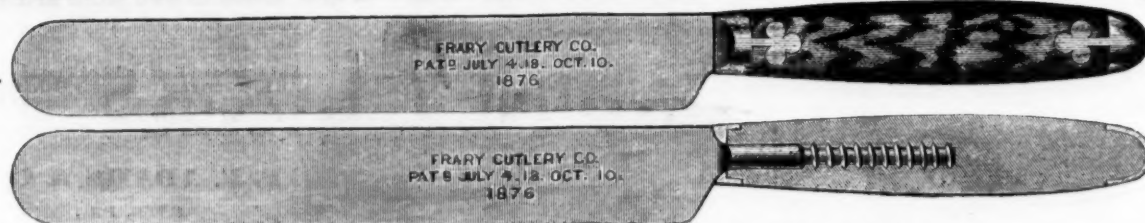
Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

THE FRARY CUTLERY COMPANY,

FACTORY, Bridgeport, Conn. NEW YORK OFFICE & WAREHOUSE, No. 82 Chambers St.

Manufacturers of all kinds of Table Cutlery.



The above illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.

There is no question but that a solid handle knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the knife or fork, and screwed firmly and securely in the handle and locked there by the bolsters, making a very strong neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butcher and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

SILVER PLATED SOLID STEEL
HANDLE KNIVES.We guarantee 12 dwts. of fine silver on each dozen of Table or
Medium Knives. All our Spoons, Forks, &c., made of 18 percent.
Nickel Silver. We warrant our extra plate

On Tea Spoons..... 2 1/2 ounces per gross.
" Dessert Spoons..... 3 1/2 " "
" Table Spoons..... 5 " "
" Dessert Forks..... 3 1/2 " "
" Medium Forks..... 5 " "



P. O. Box 204.

HARTFORD, CONN.

Cutlery.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST
MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

CORPORATE MARK.



Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

F. W. HARROLD,
Birmingham and Sheffield,
ENGLAND.

Importer on Commission

HARDWARE, CUTLERY, GUNS, &c.

W. SANDERS, Agent,

76 Reade Street, N. Y.

Cutlery.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm & Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

CORPORATE MARK.



Granted 1777.



RUSSELLS

PARALLEL
TOOLS.

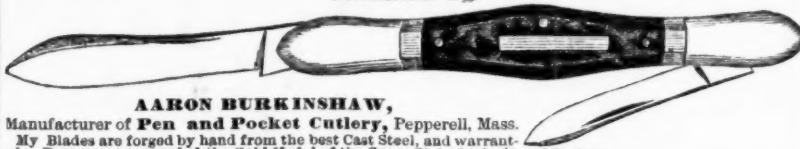
PATENT

HAGSTOZ & THORPE.

Sole Manufacturers and Proprietors.

Sixth and Chestnut Sts., Philadelphia, Pa.

ESTABLISHED 1853.



SHEEP SHEARS.

W. Clark's

Simple in action. Fleece evenly shorn without
injuring the skin. Is held firmly in right hand and
easily operated. Also
CLARK'S HORSE CLIPPERS.

No. 1 for two hands; No. 2, one hand, for heads
and manes; No. 3, one hand, for legs and coarse
hair; No. 4, for two hands, with improved spring.
Send for price list.

McCOY & CO.,

SOLE AGENTS,

134 and 136 Duane Street, New York.

Established 1853.

AMERICAN SHEAR CO.

Manufacturers of

Pen and Pocket Cutlery,

Shears, Scissors and Pruning Shears,

HOTCHKISSVILLE, CONN.

Salesroom, 298 Broadway, New York, with

LANDERS, FRARY & CLARK.

Young's Patent Folding Scissors.



See simile of the small size.

These Scissors are made of the very best steel, nickel
plated, and so constructed that they can be readily
folded and carried in the pocket without injury to the
contents. A sample pair will be sent by mail, to the
trade only, upon receipt of the retail price, namely:
For small size, either blunt or pointed..... \$1.00
Large size, pointed or half pointed..... \$1.50
New York, Feb. 1st, 1876.

MARX BROS., Proprietors,

430 Broadway.

PROTECT THE WALLS.

The Star Friction Mat,

To light Matches on.

THE STAR FRICTION MAT,

With Pocket to hold the Matches.

Send for illustrated price list.

J. B. COLT & CO., Manufacturers of NOTIONS.

Factory, Brooklyn, L. I. Salesroom, 27 Broadway, N. Y.

SPECIALTIES TO ORDER.

What Has Been Done and What Is
Doing in the New Iron District of
Ohio.

CINCINNATI, Dec. 15, 1877.

To the Editor of the Iron Age.—DEAR SIR:
In my letter from Portsmouth, dated Nov.
24th, I promised to give you some additional
facts of the progress of operations in the
new iron district of Ohio, as soon as some
satisfactory developments had been made.
Having just received some interesting and
reliable information from that district, I
respectfully submit the same for your perusal
and for publication, if you deem it worthy
of the space it will require in your valuable
columns.

Having omitted in my last letter to give
you a statement of the size and condition of
the Baird Furnace, I will now give you a
short account of it. The Baird is located
about 3 miles north of Gore, on the Straits-
ville branch of the Columbus and Hocking
Valley Railroad. The size of the stack of
this furnace is 44 feet by 11 feet in the bosh
and 8 feet at the top. It is doing well, run-
ning mostly upon mill iron (and some foundry
of good quality), made entirely of native
ore and fuel, and is now turning out 14 to
15 tons per day.

The furnace of the Akron Iron Company,
at Bessemer, was not put in blast as early as
was expected by five days, but was very
successfully blown in on Friday, the 30th
ult. Its manager is starting slowly, and
carefully watching its progress from day to
day. The result of its first week's run (up
to the 7th inst.) was highly gratifying to
the company, giving them sufficient data for
a fair calculation of the capacity to which it
can easily be brought. The manager, Mr.
John Buchtel, says he can readily increase
the capacity, at any time, to 30 tons per day.
During its first week's run it carried only
about three-fourths burden, with the hot
blast at from 400 degrees to 450 degrees,
casting only twice each day, and making
from 20 to 22 tons of No. 1 and No. 2 foundry
iron. The result of the first week's
operation of this furnace has been anxiously
waited for by those who are building fur-
naces in that region, and I need not tell you
that they are highly pleased with the way
the Akron has behaved from the day its
smoke stack was blackened by its first burn-
ing charge. Leaving the Akron, I will now
give you a short account of the progress
which has been made at (what is now justly
entitled to the name of a town) Bessemer.
On the 13th, 14th and 15th of November, a
second sale of lots was made at auction, and
156 were sold at an average of \$250 each.
Besides these, some 20 other lots in the town
were sold at private sale. The original idea
of building a Bessemer steel works at this
town has not been changed, and certain
capitalists are prepared to invest in it as soon
as a company can be fully organized. I am
informed that none of the furnace com-
panies in this iron region anticipate any
serious inconvenience from a scarcity of
water during the dry seasons, and that those
now erecting furnaces there have selected
sites with a full knowledge of the amount of
water which they will require, and of the
means by which they can acquire an ample
supply. A contract was made some time
since by Mr. Shields, of the Licking Iron
Works, and Mr. Davis, of the XX Furnace,
at Shawnee, with the owners of the Bosley
tract, near that place (in which tract Mr.
W. D. Lee, of Newark, Ohio, is a large
owner), by which each of the two companies
mentioned have agreed to take out 15,000
tons of ore per year, for 7 years, at 40 cents
per ton, both companies being confined to a
section of the above-named tract, compris-
ing 20 acres; this tract is said by competent
civil and mining engineers, who have thor-
oughly investigated it and made absolute
entries under the hill, to contain 4000 tons
per acre for each foot of thickness, and that
the ore on this tract will average at least 2 1/2
feet in thickness. During the past 10 days
of pleasant weather rapid progress has been
made toward the completion of the furnaces
in this region, as also in the laying of branch
railroad tracks to the furnaces. Those inter-
ested are becoming more and more sanguine
of ultimate success.

Yours truly, T. T. M.

Railways in Japan.—A report of the
secretary of the Belgian legation in Japan
states that the first railway opened in Japan
was the Yokohama and Tokio, 18 miles long,
of narrow gauge, and with carriages of light
construction, similar to tramway cars. The
journey from Yokohama to Tokio occupies
about an hour. A prolongation from Tokio
to Tagasaki is now being studied. The Kobe
and Osaka line, 22 miles long, was opened in
1873, and that from Osaka to Saikio or Kioto
in February, 1877. These two are of broader
gauge, with substantial works, well built sta-
tions, and the usual type of rolling stock.
The three have been built and superintended
by English talent, and the materials and roll-
ing stock come from England. The line from
Kobe to Saikio is to be completed by a line
to Isewaga. The idea of connecting Saikio
with Tokio is abandoned for the present, the
treasury being too heavily loaded, the debt
contracted to the date of the report having
been 152 million yens, or 836 million francs.
With regard to tramways, a Belgian company
is endeavoring to obtain the concession for
one at Tokio.

Real Estate.—When William the Con-
queror had finished parceling out the prin-
cipalities of England among his Norman
lieges, the Domesday Book enumerated 45,-
706 owners of real estate outside of London.
Eight centuries of civilization have reduced
that number of landholders to 30,776, and
land-hunger, as the Germans call it, is steadily
diminishing that small number. In this
country, in addition to the landowners of
the thirteen original States, 1,100,000 pieces
of real estate have been carved out of the
wild lands east of the Mississippi, and west
of the Father of Rivers, at least 600,000
more. It is safe to say, therefore, that there
are to-day not less than 2,000,000 owners of
real estate in the United States, as against
the 30,000 of England; and we add more
than 50,000 to that number every year. The
great majority of these cultivate their own
lands and dwell beneath their own roofs.
Every man of them has an interest in the sta-
bility of that government that gives them
certainty of tenure.—Appleton's Journal.

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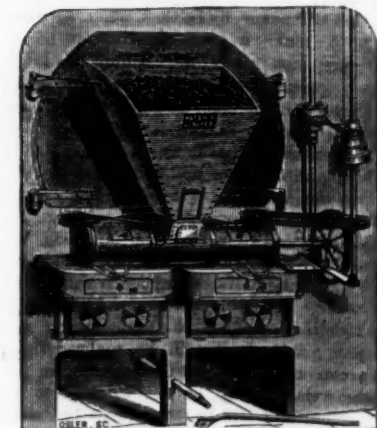
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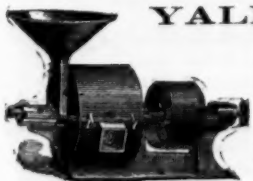
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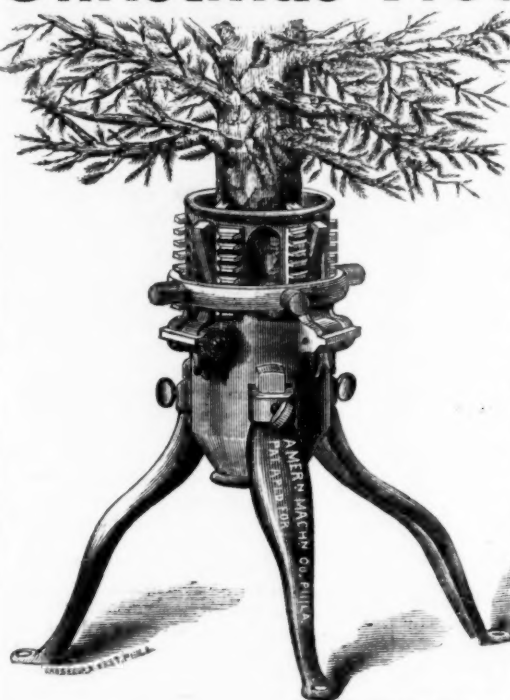
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Our careful and accurate correspondent in Philadelphia, whose letter is always of value and interest, informs us this week that the contract of the Russian government with the Baldwin Locomotive Works for forty locomotives has been concluded. On the 17th instant the firm received from Dr. Parry, now in Russia, directions to immediately proceed with the work. We understand that the engines called for in the contract are all of large size, 5-foot gauge, for freight service, and that they are to be finished during February and March next. Dr. Parry states that the Russian government has absorbed nearly all the railway plant for war purposes, and that it is being rapidly used up and destroyed in the ruinous service. Meanwhile the largest crop of wheat ever raised in Southern Russia and Bulgaria is rotting in the bins for need of transportation. This wheat, which usually finds an outlet from the Black Sea ports, will have to be transported by rail to the Baltic ports,

and about 300 new engines will be required at once. A large proportion of these will, however, be built in Europe.

Steam Lines and our Export Trade.

The enthusiasm of our manufacturers in favor of a vigorous effort to develop and extend our export trade, is amply warranted by the popularity of American goods in foreign markets and the increasing attention paid to them by foreign consumers. We have only to renew in Paris the laurels won at Philadelphia, to find opening to us an increasing demand for our manufactured products and machinery of production, and it would be natural to conclude, from a superficial glance at the situation, that a trade thus begun will grow naturally if our manufacturers use due diligence in ascertaining and meeting the requirements of foreign consumers.

But there are other and important factors in the problem of a great, permanent and profitable export trade, which must not be lost sight of; and before we can expect to attain success, it is necessary to have a clear understanding of the difficulties to be met and overcome. The most serious of these is the lack of facilities for doing an export business on terms as advantageous to ourselves and our customers as are possessed by our principal foreign competitors in the export trade. In ocean transportation long distances count for little, but time is always an element of prime importance in business transactions of every form. In this respect the British manufacturer has an advantage over his competitor in this country which fairly offsets many of the disadvantages which we have been enterprising enough to profit by.

With the exception of the lines giving us direct connection with the British and North German ports, we have no regular steam communication with transatlantic markets. Many of them, which can be reached only indirectly by steam or directly by slow sailing craft, are the most important of those with which we seek to establish important commercial relations. For example, the Mediterranean ports are practically closed to us for want of steamship facilities, notwithstanding the fact that they are enormous consumers of goods which we could supply advantageously and profitably in competition with all the world. Their imports of coal from Great Britain reach enormous annual totals—something like 5,000,000 tons—at prices which American exporters would find remunerative. Of cotton, they consume upward of 400,000 bales per annum, and we already supply them indirectly with large amounts of grain and provisions. Barcelona imports 200,000 bales of cotton yearly; Genoa, 200,000 bales, and Marseilles, about 80,000 bales. The importance, commercially, of the city last named could scarcely be overestimated, since it supplies all the French-speaking colonies, and occupies a position to them very similar to that which Liverpool and London occupy to the English colonies. It is, in fact, the great distributing port of the Mediterranean, and since the opening of the Suez Canal it has gained a vastly increased commercial importance. It is not necessary to present an array of statistics to show that our lack of direct steam communication with these markets of the Mediterranean, is not to be explained on the ground that the volume of trade to be moved would not justify the establishment of steam lines to move it. There is no question as to the fact that outward cargoes could be had the year round, and that during part of every year it would tax the capacity of a steam line to carry all the freights which could be had, unless more steamers were employed in the service than any one company could profitably run. As regards return cargoes, we are in a position to say that, at the time of this writing, there are no less than 15 steamers loading in Mediterranean ports with goods for direct shipment to the United States. After discharging these cargoes in New York or Philadelphia, these steamers will take cargoes for British ports, and thence will clear for the Mediterranean, probably with cargoes largely made up of American products and manufactures. Considering the increase of trade naturally resulting from the establishment of a direct steam service, we think it safe to assume that such a line would secure a full cargo every week in the year at both ends of the run. With these facts before us, we are not surprised to learn on excellent and trustworthy authority, that an American line to the Mediterranean will probably be attempted early next spring.

One need have no especial familiarity with foreign trade movements to perceive that this will do more to develop our export trade in a week than could be accomplished by talk in a century. Such a line will give our merchants and manufacturers direct communication with important markets now practically closed to them. They can then compete with British exporters not only in price and quality, but in the promptness with which goods ordered by telegraph or mail can be delivered; they will become aware of wants and opportunities for trade now unknown, and have every inducement to push for the control of these markets and their foreign trade, instead of being content, as now, with sending thither a few goods from time to time to be sold as novelties. An enterprise of this kind would undoubtedly encounter serious difficulties at the outset, and would require large capital and good management, but it will be the legiti-

mate outgrowth of an existing commercial necessity, and will find an assured basis of prosperity in the trade already developed.

When we undertake the practical business of competing with England for her export trade, we must first make ourselves independent of English ocean carriers. It was stated before the committee of Congress appointed to hear the claims of the new South American line, that the owners of British steamers would rather see them laid up in the Mersey than profitably employed in carrying American manufactures to markets now supplied from Great Britain. This is an exaggerated statement, without doubt, but the grain of truth it contains will warrant the assertion that the British steamship owner would rather see his vessels idle part of the time in British ports, than attempt the task of building up a profitable trade between New York or Philadelphia and any foreign port with which a large direct trade has yet to be created. The real difficulty is that it takes time to build up a paying traffic between ports not already enjoying the advantages of intimate commercial relations. They are unwilling to take any risks in the matter, and unless guaranteed against losses by a subsidy in some form, they will not interest themselves. The same is true, to a great extent, of American capitalists. The starting of a steamship line involves a great risk. The capital to be invested is necessarily large; a close economy cannot be secured at the outset, and many possible causes may operate to disappoint for a time the best-laid plans. In view of all these possibilities, a subsidy in some shape appears to be a necessity—first, because our manufacturers cannot introduce their goods successfully into foreign markets without steam lines; second, because capital will not seek investment in unsubsidized steamship lines to compete with lines already well established or enjoying the benefits of subsidies from foreign governments.

If it be true that the future industrial development of the country depends upon the success of our efforts to secure foreign outlets for our manufactures—of which we think there can be no question—is it not to the advantage of the whole American people that Congress should adopt a liberal policy toward such steamship lines as are organized in good faith by responsible men, and which can make a good showing of prospective profits? We cannot expect that the government will carry on, year after year, enterprises which private capital cannot sustain, but it can well afford to make liberal mail contracts for two or three years at the outset, knowing that the aid thus extended will be employed in providing facilities for trade, without which the hopes our people now indulge of a great and promising export of the products of our labor, can never be realized. If ever conditions existed which justified the subvention of private enterprises, we find them in the case of the steamship lines which have been or will be organized to establish direct communication with important foreign markets. We consider it a cause for congratulation that we are sending cotton goods to England, and regret that existing conditions do not favor a considerable export of these same goods to South America; but when we learn on good authority that some part—we do not know how much—of the goods we send to Great Britain are there repacked, relabeled and sent to South America to be sold at high prices as British cotton fabrics of superior quality, we do not require keen vision to discover why it is that such an indirect movement is possible. Great Britain has facilities for doing business with South America which we do not possess, and freights can be sent to many South American markets by steam via England, as quickly and cheaply as they can be sent direct from here by sail. We need no better arguments than the facts of the case to show us the importance of first providing ourselves with the facilities for doing business, if we hope to compete in a large way, and on equal terms, with Great Britain.

Comparison of the Work of Blast Furnaces.

There seems to exist a good deal of misapprehension as to the advantage to be gained from the building of large furnaces. The large amounts of iron made by the Lucy and Isabella furnaces, at Pittsburgh, have led to a general impression among furnacemen who have given but little attention to the literature of the subject, that the result sought for in their construction was a great product. While it is no doubt true that the builders of these furnaces had in view an increase in the daily product over the 55 by 15 foot furnaces that were the common type in the neighborhood of Pittsburgh at that time, the prime consideration was economy of fuel and, perhaps, an improvement in the quality of product. The papers read before different technical societies, and the discussions on the same, prove conclusively that these advantages were what the advocates of large furnaces sought in adopting them, and that they expressly disclaim the idea of an output increased in the same proportions as the enlargement of the furnace. The papers of Mr. I. Lowthian Bell, before the British Iron and Steel Institute, and those of Mr. Charles Cochrane, before the Institution of Mechanical Engineers, both argue the question mainly with reference to a reduced consumption of fuel. Mr. Bell expressly states, in the discussions of the Iron and Steel Institute in 1871, that he "never

found that a furnace of 25,000 cubic feet did twice the work as well as one of half the size."

These remarks are suggested by an article which recently appeared in the *Sharon (Pa.) Herald*, comparing the work of the Stewart furnaces of that place with the Lucy furnace of Pittsburgh. The article contains some errors and misstatements respecting the Lucy furnace and its work, doubtless unintentional, and its statements regarding the Stewart furnace are so imperfect that it is hardly possible to institute a comparison. The statement is as follows: "We find the Lucy to be 75 feet high and 20 feet boshes, and her greatest recorded yield to be 762 tons (throwing aside fractions), grading from gray forge to No. 1 foundry, the pressure of blast from 4 to 8 pounds to the square inch of egress. We find the fuel used to be 3350 pounds of coke to the ton of iron, 750 to 1000 degrees Fahrenheit as the heat of the blast. There was no note made of the hot-blast oven, but it is our impression that it is a Whitwell oven. We find the greatest recorded yield of the Stewart Furnace No. 2 to be 379 tons, principally No. 1 Bessemer; her height is 55 feet, and boshes 14; her pressure of blast is not quite so high as the Lucy's, being only about 5 pounds; neither does the heat of the blast run up as high, being only about 750. The fuel used is one-half Shenango Coal Company's coal and one-half coke, and 3600 to the ton of iron. The hot blast is a common iron one. These measurements, without considering the angles, lines or crucible of either furnace, will give the Lucy 23,562 cubic feet of producing power, and the Stewart furnace—same measurement—3466 cubic feet, which makes the Lucy almost 67 per cent. to the Stewart furnace. Taking the Stewart furnace at 379, as a criterion, it would require the Lucy to give close to 1100 tons per week."

The Lucy has an ordinary U pipe hot blast; averages about 650 tons per week of Bessemer No. 1; consumes in making Bessemer pig an average of 70 bushels of coke, (2800 pounds), and the internal capacity is less than 13,000 cubic feet. If the exact dimensions of the Stewart were given, we would be able to make such a comparison as was intended to be made. As it is not, the best that can be done is to compare them by the squares of the diameters of their boshes. This would assume that the other dimensions in each furnace bore the same relations that the boshes do, which may be the case or may not. On this basis of comparison, the furnaces should be to each other as 196:400, or, in round numbers, as 1:2, and not nearly 1:3, as the *Herald* makes it. On the basis of 196:400, when the Stewart furnace makes 379 tons the Lucy should, if there is anything in this way of comparing furnaces, make 773 tons, quite a difference from the estimate of the *Herald*, and very nearly what the highest run has been.

But is there anything in this method of comparing furnaces? As a basis for estimates of the probable yield it is quite useless. So many conditions enter into the working of a furnace to change its output, that the only practical value of any such calculation is to show the relative number of cubic feet internal capacity per ton of iron produced in 24 hours, or any other given time. The calculation is just this: If a given number of cubic feet internal capacity produces, in a given furnace, a certain number of tons of iron per week, how many tons should a furnace twice as large produce, assuming that the same number of cubic feet internal capacity should produce the same number of tons per week in each furnace? But the same number of cubic feet internal capacity does not represent the same output per week. It was never claimed that it did, and, therefore, such comparisons are nearly, if not quite, valueless.

In this connection it might be said that the number of cubic feet internal capacity per ton of iron made in 24 hours, is much greater in the large British furnaces than in the smaller ones. At the Clarence furnaces (Mr. Bell's) four types of stacks of very different dimensions, yielding Nos. 3 and 4 iron, gave the following results:

	Old fur. of 1853.	High fur. of 1855.	High fur. of 1865.	High fur. of 1870.
Tot. cap.	6000 c. ft.	11,500 c. ft.	15,800 c. ft.	27,000 c. ft.
Hight.	45 ft.	80 ft.	80 ft.	80 ft.
Prod'n.	30 tons.	38.6 tons.	50 tons.	60 tons.
Cons'n of coke per ton iron	39 cwt.	27½ cwt.	22½ cwt.	22½ cwt.
In internal cap. per ton iron	200 c. ft.	300 c. ft.	330 c. ft.	380 c. ft.

*The cost is 112 lbs.

Other furnaces show a larger internal capacity per ton of iron made in 24 hours than this. The 1868 furnace of Messrs. Bolckow, Vaughan & Co. gives 490 cubic feet, and the new Ferryhill Furnace, 80 feet high, 420; but in the latter it is claimed that pig is made with a consumption of 2240 lbs. of coke.

Though the design in erecting large furnaces is economy of fuel, it is generally conceded in England that beyond a certain limit there is little gained in the large furnaces. A capacity of 11,000 to 12,000 cubic feet and a height of 70 to 80 feet, seems sufficient to realize all the economy possible from an increase of size under the conditions existing in Cleveland. In this country the conditions are somewhat different, but as yet no thorough investigations of the relative economy of large and small furnaces have been published. The indications are, however, that in the coke iron regions but little

has been gained by the use of large furnaces. Small furnaces working Lake Superior ores with Connellsville coke, are making more iron proportionately without the use of any more fuel.

American Exhibits in Paris.

The tardy action of Congress on the bill providing for American representation at Paris next year, is a somewhat ungracious answer to the invitation of the French government to participate in the coming international exhibition. It is, however, better than no action at all, and is better late than never. The promptness of the President in appointing ex-Governor McCormick to the position of Commissioner General, shows that he recognizes the fact that there is no time to be lost. Our choice for this position would have been Mr. Goshorn, whose faithful discharge of the duties of his laborious position as Director General of the Centennial entitled him to recognition at the hands of the government, or Hon. Daniel J. Morrell, who, as Chairman of the Executive Committee of the Centennial Commission, also placed our government and people under large obligations. We have, however, no objection to Mr. McCormick. He is a modest gentleman of unquestioned probity, large culture and tried executive ability. That he will discharge the duties of his new office acceptably, and with dignity and grace, we have no doubt.

We have been asked by several readers for specific information on many subjects connected with the coming exhibition, and especially what intending exhibitors should do to secure space, provide for the care and proper explanation of their goods, insure their safe return, &c. We are informed that Mr. McCormick will issue a circular early next week, prescribing rules and regulations and giving the public all the information necessary. As this circular will be given a wide currency through the medium of the public prints, it is unnecessary for us to anticipate it, especially as it would be difficult at this time to obtain exact information on all the questions raised by our correspondents. As we shall probably be able to publish the full text of the rules and regulations of the commission in our next issue, it is better to wait for it.

In the meantime, we should advise every American manufacturer who makes goods which he considers worth exhibiting, or for which he desires foreign orders, to lose no time in getting ready. It will be time enough to make applications for space when the Commissioner General prescribes the form; but the vessels which will carry American exhibits to France—two sailing ships and a steamer, under direction of the Secretary of the Navy—will sail in February and March, and what is not ready to go then will be left behind. There is still time enough, but not too much.

The importance of this exhibition to American manufacturers seeking foreign markets, cannot be overestimated. The Centennial was immensely beneficial in calling the attention of foreign nations to the variety, excellence and cheapness of our manufactures and machinery; but from what we could show at Paris the benefit would be a thousandfold greater. The number of foreigners visiting the United States last year was comparatively small. Our manufactures are known to the masses of consumers in Europe only through favorable official reports and complimentary newspaper correspondence. What they have heard has interested and, perhaps, surprised them, but the impression will not last unless we show them the goods of which they heard so much. The American department will be an object of much interest and curiosity. If it is a disappointment, the conclusion will naturally be that, while we were able to make a good showing at home, we are not ready or willing to risk the chances of a comparison of our goods with those of the older nations of Europe on neutral ground. In considering this subject, let us remember that in Paris, far more than at Philadelphia, we are exhibiting to the whole world. Paris is the center of European civilization,—the objective point of Continental travel from whatever direction. To its exhibition will come the representatives of every nation, and its influence will be felt in every corner of the civilized world. Philadelphia realized this expectation only in part; at Paris it will be realized fully. We can make it the turning point in our commercial history, but, if we neglect the opportunity, it will be many years before we shall have another as favorable in its promise of great and permanent benefit.

British Goods and Competition.

The British nation is standing appalled at a terrible apparition which is rising up before them in a shape so distinct and formidable that they cannot forget it even when they resolutely shut their eyes. It is Competition, the most dreaded of ogres. In a word, our English neighbors are thoroughly aroused to the dangers which menace their foreign trade. There never was a time when the subject attracted so much attention; there never was a time when the public speakers of the day paid other nations such compliments upon their manufacturing progress; never did the newspapers devote more space to startling comparisons of the prowess of Great Britain and of America, France, Germany and Belgium, whereby it was never more clearly demonstrated, shown and de-

tailed, that England is gradually sinking into the abyss of nothingness; and never before has the subject been so fairly and squarely brought home to the mind of the British workingman. The average workingman is even yet a beer-drinking and somewhat besotted individual, but among the artisans of all the largest towns there is a class—rapidly growing in numbers—of men who are intelligent, studious, observant and conscientious in the use of their bread-earning tools, and who are destined to cause the English manufactures of a few years hence to be vastly ahead of what they now are. In speaking to a large meeting of trades unionists at Sheffield last week, for instance, Mr. Mundella, M. P., had the courage, rare in members of Parliament, to speak to those before him in the following terms:

If we are to maintain our ground as we ought to do, we must do it not only by bringing work to the forge and the loom, but brains with it. We must have increased intelligence in our workmen; we must bring more thought and intelligence to bear, and we must develop a better system of instruction, so that science may be applied to our manufactures—take hold of every new appliance, look at every new machine and use it if we can. I would say to you, as the experience of my life, that invention is the best friend of the workingman; that nothing has done so much for the workers of England as good machinery.

Other speakers and writers have of late discoursed very largely in this strain, until there is now a settled conviction in the minds of both masters and men that they have to do something, and that at once, in order to stem the rising foreign tide. Precisely what they mean to do does not yet appear. It is not supposable, however, that the British nation will consent to continue losing ground without a struggle to regain and retain their present advantage. It is a fair race, and were it not that a nation cannot change its whole industrial system in a year or two, we should be more apprehensive of the result. If they can impress consumers with the idea that quality is of secondary importance to cheapness; that finish, neatness of packing and general attractiveness are not aids to the dealer in satisfying the wants of the consumer, and that the world has made no progress to speak of for a generation in adapting manufactures to the uses for which they are intended, they can defeat us at every point. If, however, they fail in this and are compelled to meet competition in quality as well as price, they will find it a work of years. A conservative people like those of Great Britain do not readily adapt themselves to changed conditions, and an industrial revolution will not be brought about until it becomes an absolute necessity.

Economic Questions Regarded from the Standpoint of Self-Interest.

In nearly all of the discussions concerning free trade and protection, especially during the last ten years, the opponents of protection have insisted that their arguments were based on "broad principles" and it was only from a narrow and contracted view of the laws of trade that protectionists could derive any arguments. When reminded of the fact that they had been for years protectionists, and even adopted its most ultra form, embargo, the reply of our English friends was prompt. They had been protectionists, but they saw the error of their ways, had repented and were desirous of doing works meet for repentance. Like all converts whose repentance is somewhat questionable, especially in regard to the motives, they rather overdid it. When America suggested that it was an error it worked so well in England for a time that they were inclined to keep it up a little longer, our evangelists of free trade got a little angry and told us in good, unmistakable English that we were making fools of ourselves. The fact that we had been endowed with such wonderful resources, especially in the agricultural line, was a clear indication that we were to raise corn and cotton, and not manufacture cloth; that by an almost wicked stretch of forbearance and long-suffering we might be allowed, by these broad principles, to make pig iron, but it was an unpardonable offense to convert it into bar and steel, and as for converting that iron and steel into tools and machines, the audacity of such a traversing of nature's laws absolutely took away their breath, and the arguments of our good friends over the water, who were so solicitous that we should follow the path marked out for us, were dropped in sheer astonishment.

Let the foregoing may be regarded as pleasant by those who have paid but little attention to the course of the discussion, we affirm that it does not travesty the arguments used in the English journals in discussing free trade and protection. It is not four years since we read in one of the English papers devoted to iron and its allied industries, the statement that it was the duty of a country to produce what they could the cheapest, and that any other course than this was a clear violation of the intentions of Providence.

But it seems our zealous friends are backsliding. They see lions in the way and are afraid and want to turn back. As the *Engineer* says: "Those who study the signs of the times are aware that free trade no longer enjoys in England the popularity which it once possessed," and, as the same paper also remarks, "plenty of people are to be found who express grave doubts as to whether Mr. Cobden's axioms are as admirable in reality as in appearance."

We certainly do not believe that the arguments advanced in favor of free trade have all been dishonest, even though some who have urged them are now

inclined to favor protection. In each case their interests have led individuals to the conclusions they have stated as broad principles. The demand for protection that is growing up in England springs naturally from her loss of trade, and we believe that the true way of looking at this question is from the standpoint of self-interest. If the English people reach the conclusion that a tariff will further their business interests, they will not let the question of "principle" stand for an hour between them and protection.

Scientific and Technical Notes.

In ordinary galvanic batteries, as is well known, the electric current results from the action of an acid upon a metal. In

A NEW GALVANIC BATTERY.

invented by Paul Jabluchoff, of Paris, well known in connection with the electric light which bears his name, current is produced by the action upon carbon of a solid body in a state of fusion. Instead of taking a metal for the negative electrode of a battery—that is, the electrode which is consumed in the action—he takes coke or an artificial conglomerate of carbonaceous matter possessing the same qualities, and acts upon this electrode by means of nitrate of potash or of soda or of ammonia in a state of fusion. He prefers to employ the nitrate of soda on account of its cheapness. The carbonaceous matter is acted upon by the molten nitrate in the same manner as zinc is acted upon by the different acids or salts in the ordinary batteries. As the second electrode, he places in the same liquid either platinum or other metals that are not acted upon by the presence of carbon. The crucible itself, in which the nitrate is fused, may constitute the positive electrode. For introducing the carbon into the liquid, the former may have attached to it a metal rod which serves for attachment of the conducting wires, or he places a metal grating or perforated metal receptacle in the liquid in which the carbon is contained, such grating or receptacle being insulated from the crucible if this constitutes the second electrode. In the latter arrangement the carbon may be added from time to time, as in a furnace, in proportion as it is consumed. For bringing the battery into action in the first instance, the nitrates may either be fused in advance in the crucible and the carbon be then introduced, or the nitrate may be placed in the crucible in a pulverulent state and the carbon be ignited and plunged into the nitrate, which will become fused thereby. While the battery is in operation, large quantities of gases are developed similar in their nature to those produced by the combustion of gunpowder. These gases, collected by any suitable arrangement, as, for instance, in a boiler or closed chamber, may be utilized as motive power, so that the improved battery serves as a source both of electricity and of motive power. By mixing various metallic salts with the nitrates, the double effect may be obtained of regulating the intensity of action of the battery, and of obtaining metallic deposits upon the positive electrode, as in the ordinary electro-plating process. According to one arrangement of batteries, constructed according to this invention, the crucible containing the nitrate and carbon forms the positive electrode, the carbon being suspended in the liquid nitrate in a wire-gauze cylinder attached to a cross bar, the ends of which rest upon a ring of insulating material on the top of the crucible. The latter is closed in by a hinged cover having an aperture, to which is connected a pipe for conveying the gases generated to wherever required. According to another arrangement, the crucible is made of earthenware, glass or other suitable non-metallic substance, centrally within which is placed the wire-gauze cylinder containing the carbon, and surrounding this is a metal cylinder constituting the positive electrode, or this may simply consist of a rod or bar of metal. If it be desired to employ the battery principally or entirely for utilizing the gases generated as motive power, the crucible or vessel containing the nitrate and carbon is closed at top, and is provided with a pipe leading to a boiler or closed vessel for collecting the gases under any desired pressure. The top or dome of the crucible may in this, as also in the previous arrangements, be provided with a hopper by a valve, through which carbonaceous matter may be introduced from time to time, and also with a second hopper for the addition of nitrate when required.

Much excitement has been created at Ems, in Germany, the most famous of Continental watering places, by the threatened destruction of the baths which are its main dependence. The mining companies working in that neighborhood are

UNDERMINING THE SPRINGS.

The mines formerly supplied lead and silver only, but since the extension of the manufacture of steel, the gangue rock—which is a carbonate of iron—has become more important than the other parts of the ore. The fact seems to be that the increased activity given to the operations by this new source of profit has led to excavations to a depth which may really interfere with the natural water-courses of the region. Such a result is by no means new in mining, for, frequently, wells and springs dry up when the shafts near them are sunk to a great depth. Sometimes the mine is the sufferer from the mishap, as was the case with the famous Rammelsberg copper mine. The discovery of a very rich vein in one portion of the workings was followed by the drying up of the wells in Goslar, a town of 10,000 inhabitants, situated two or three miles from the Rammelsberg shafts. The managers were obliged to wall up their rich stores and forego the benefit of working them. At Ems, an investigation has been ordered, but as yet the result has not been reported, so that, for the present, it cannot be determined whether the baths or the mines are to be the sufferers.

As a substitute for the standard candle for photometric measurements, Mr. Vernon Harcourt proposes a

NEW UNIT OF LIGHT FOR PHOTOMETRY. He advocates the use of a hydro-carbon vapor, mixed with air, and burnt through a

large burner. The hydro-carbon used is that portion of American petroleum which, after repeated rectifications, distills at a temperature not exceeding 50 degrees C., and consists almost entirely of pentene, the fifth member of the series of paraffines. To prepare the gas, he draws into a gas-holder the required volume of air, chosen according to the capacity of the holder, and corrected for temperature, pressure and tension of aqueous vapor; then the corresponding portion of pentene is poured into the gas-holder from a measuring flask, connected by means of glass and caoutchouc tubing to a tap in the upper plate. He proposes to maintain a proportion of 600 volumes of air to one of liquid pentene. A few minutes are sufficient for the volatilization of the liquid, and a few hours for perfect diffusion. The unit which he proposes, and which he claims is adjusted to correspond to the light of a sperm candle consuming 120 grains of sperm per hour, is the light given by a mixture of 7 volumes of pentene gas with 20 volumes of air, burning from a $\frac{1}{2}$ -inch orifice at the rate of a cubic foot per hour, under the standard condition of 60 degrees Fahr. and 30 inches pressure.

During the past two or three years a great deal of inventive talent has been devoted to the improvement of

REFRIGERATING CARS AND STEAMBOATS.

for the transportation of vegetables, fruit and fresh meat for long distances by land or water. The two patterns of refrigerator cars now in most common use, we believe, are the "Fisher" and the "Davis." Of the former there are somewhere in the vicinity of 500 in operation, running principally over the Pennsylvania Central and to New York city. There are, perhaps, two or three hundred of the Davis cars in use—a regular line of them running between Boston and the West. Most of the different methods embody important principles, and there are few of them that are not attracting attention and now being tested by different transportation companies. One of the most novel methods of refrigeration yet reported is said to be in use upon a line of steamers between South America and France. Those steamers are now going quite extensively into the transportation of fresh meat from South America, and their system is said to be entirely dissimilar to that used by exporters from this country. Just what the system is, is not stated, but neither ice, salt nor saltpeter is used, the air being purified and dried by some process without the use of ice. It is said that the wonderful machine will run for three years without being recharged. Moreover, it is said that \$750 per voyage could be saved by employing this method between New York and Liverpool. If these claims have any foundation whatever, we should be glad to know the particulars.

A simple contrivance for rapidly cooling liquids is

TOSELLI'S COOLING GOBLET.

which consists of a cylindrical cup for holding any liquid, into which may be plunged an inner goblet shaped like an inverted truncated cone, and having a bed which rests on the outer cup. Putting about 4 ounces of nitrate of ammonia in the inner goblet, filling it with cold water and stirring it, so as to hasten the solution, the temperature of the outer liquid is soon reduced to at least 22 degrees Fahr. The salt may be used for an indefinite period by spreading it on a plate after each trial, and exposing it to the sun until it crystallizes anew. The inventor prepares a salt which will lower the temperature 50 degrees Fahr. in the warmest countries.

There is now in operation in the laboratory of the Central University, Richmond, Ky., a new scientific instrument—an APPARATUS FOR RECORDING THE EARTH'S MOTION

in its hourly progress through space. It is the invention of Prof. T. W. Tobin. The principle upon which the instrument is formed is, that a delicately constructed pendulum will continue to oscillate in the same direction as started, and preserving that plane, mark the movement of the earth beneath it. The principle was demonstrated by Foucault, a French philosopher, in 1851; was verified in Boston at the Bunker Hill Monument, and lastly again at Yale College. The apparatus hitherto employed has been cumbersome, and the results obtained somewhat vague. The experiments, nevertheless, bear historical interest, and are related in modern text books on physics. Prof. Tobin's instrument is about 6 feet high, consisting of an iron tripod and delicate pendulum. There is an index attached to the upper portion of the pendulum, and when the pendulum is started this is perfectly still. In six minutes the earth's motion becomes apparent, and the needle shows about one degree of deviation. In one hour the movement is so marked that the distance traversed by the earth may be estimated from its data. The pendulum is of such delicate construction that it will remain in motion for twelve hours, and yet may be retarded or even stopped by blowing upon it.

How to Tunnel the Hudson River.

The well known consulting engineer, W. W. Evans, of this city, was drawn into a conversation by our reporter to elicit his opinion respecting the proposed plan of tunneling the Hudson River by means of air pressure. He at once remarked that air pressure should be the last resort; that as this must be equivalent to the pressure from the superincumbent or lateral masses of water and "tenacious silt," the effect upon the laborers employed is highly detrimental, as proven by experience in the caissons of the East River Bridge. Mr. Evans asked, "Why not drive the headings in the manner adopted by Brunel, when building the Thames Tunnel in England, where the conditions were very similar?" Water broke in repeatedly in the commencement of that work, but afterward, when Mr. Brunel took hold of it, he pushed through with a shield, realizing complete success. Mr. Cheesborough, who built the Chicago lake tunnel, is regarded as the highest American authority in matters of this kind. In working with a shield, a number of hydraulic jacks are employed, all the latter moved by a single pump. In building the St. Louis bridge, the

excavation was carried to the depth of 110 feet—greater than ever before for such a purpose. After all, the real question is, What shall be done with the cars coming through the tunnel after they reach New York? Where can space be found in the center of New York for a freighting and passenger business of the magnitude contemplated in this grand project?

Attaching Wages.—Judge Stowe, of Pittsburgh, has announced a new rule of practice governing the attachment of wages. The case was that of George Miller vs. George Rush, in which wages in the hands of Singer, Nimick & Co., garnishee, were attached. A rule was asked to show cause why the attachment should not be quashed. The Court says: "There is, perhaps, no other class of cases in which it is so necessary to adopt a summary proceeding as this. The law is that the laborer shall have his wages to live and support his family upon, without being liable to have them seized in execution for his debts, and courts should, as far as possible, see that this object is secured and the law so administered as best to reach the result intended. To allow wages to be attached, and then compel the laborer to wait for months, and perhaps for years, to get a trial before a jury on facts which are not disputed, is clearly wrong, and undoubtedly should not be permitted if it can be avoided. We think the court has a right to and can establish a practice to secure the end proposed, without infringing the right of trial by jury. We have, therefore, come to the conclusion that hereafter when wages are attached, as in this case, we will quash the attachment as to them, permitting it to stand so far as other debts, if any not exempt, are concerned. But whenever the allegation that the debt attached is for wages, is properly traversed under oath, we will refuse to quash, and require the cause to go to a jury to determine all questions of fact involved."

Competition with English Products

in Turin.—Mr. Brownlie, English Vice-Consul in Turin, writes to the Foreign Office as follows: "Although it cannot be said that English makers have entirely ceased to tender or take orders for steel rails, still it must be admitted that such orders as have fallen to their share have only been for small quantities, while, on the other hand, very large and increasing orders have been taken by German, Belgian and French works, competing for steel rails for the three great railway companies in Italy. The offers, however, are not public, but none but houses of good standing being admitted, it is usual, as in England (when no objection intervenes or reserves are made), to accept the lowest tender. As to locomotives, the enormous prices quoted by the best English works, in proportion to the Austrian, German and French prices, have precluded orders going to England. Germany is at present the cheapest country for locomotives. The North Italian Railway Company lately invited tenders for 20 six-coupled-wheel locomotives for goods traffic. The order was given to an Austrian house at 11fr. 20c. (gold) per kilo., free to Comorn. The lowest English tender was at the rate of 12fr. 50c. (gold) per kilo., free to Genoa. Of the various articles required for the rolling stock of the North Italian Railway Company between 1874 and 1876, only a very small portion was taken from England, prices quoted by English being always much higher than those of Belgian, French and German makers, while the quality of the steel and iron was not always much better. English houses are, however, always invited to tender by the company. In 1877, all axles, wheels and crank axles have been ordered in Germany. French houses have competed with the best English houses, and obtained orders for files and other tools. On the other hand, England still competes favorably for copper and brass. In quality and make, English makers still maintain an undoubted pre-eminence over the Continent, especially in brass tubes for locomotives." Important testimony to the same end is borne by Mr. A. Dixon (a Sheffield gentleman) in the course of a letter from Florence to the Sheffield Telegraph.

Exports of Arms and Ammunition.

Ten steamers laden with arms and ammunition have left this country for Constantinople within a year, and still another—the John Bramhall—is now at New Haven nearly ready to sail. The usual amount paid for the charter is £7000 to £8000 sterling from New York out, the steamers depending on a return cargo of fruit from the Mediterranean for a part of their compensation. The latter is mostly consigned to a large mercantile house in South street, New York city, who are said to be building five more steamers in England expressly for the trade. In these heavy purchases of arms and warlike material Turkey shows financial resources which may well excite surprise, as everything is paid for prior to the shipment of the goods. It is understood that a considerable part of the cargo of the John Bramhall, now loading, consists of machinery for the manufacture of ammunition. On her previous trip she took out 70,000 rifles, valued at \$15 each, besides ammunition, etc., worth \$450,000 more. We understand that up to the present moment recent disasters to the Turkish arms appear to have no effect as regards the continuous orders for manufacture and shipment abroad. The largest cargo taken thus far was that of the Lotus, which sailed from New Haven last January with a cargo valued at \$1,950,000.

The report circulated that it was the intention of the Westinghouse Air Brake Company to establish a manufactory in France, seems a mistake. The truth of the matter is that in order to comply with the French Patent laws, and to procure valid patents, it was necessary to make some of the air-brake apparatus in France. It was also necessary to have a disinterested person, who could testify that he was familiar with the apparatus; knew when it was in good working order; could certify that he saw the same manufactured within the boundaries of France, &c. For this purpose the company sent three of their machinists to that country, with machinery, &c.

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TEMPERING STEEL WITH STEAM.
ON THE CONSTITUTION OF TEMPERED SUBSTANCES.
STAMPING TENSILE STRENGTH, ETC., ON IRON AND STEEL.
MANGANESE BRONZE.
ORIGIN OF NATIVE BORACIC ACID.
DEPHOSPHORIZING IRON IN THE BESSEMER CONVERTER.
MANUFACTURE OF BRICK FROM BLAST FURNACE SLAG.
THE SEPARATION OF IRON ORE BY MAGNETISM.
UTILIZATION OF SULPHUROUS ACID GENERATED IN ROASTING BLEND.

The *Metallurgical Review* publication which owes its origin to the fact that the changed conditions of success in all departments of metallurgical industry have rendered necessary a closer and more intelligent regard to scientific economy in the mining and reduction of ores and the working of metals. Newspapers, of necessity chiefly concerned with matters of commercial interest, cannot give space to the exhaustive consideration of subjects pertaining especially to the work of the metallurgical chemist and engineer, nor are they suitable mediums for the publication of essays and papers embodying the results of scientific research and experiment, owing to the inconvenience of filing them for permanent preservation. Books, on the other hand, cannot keep pace with the progress of the times, and writers frequently find their works obsolete before they are out of press.

In *The Metallurgical Review* it was sought to establish a magazine which should be a record of current progress in metallurgical science, combining the enterprise of a newspaper and the convenience and permanent value of a book.

Knowing the keen interest now felt by those engaged in metallurgical industries in whatever tends to promote scientific progress, and having learned from experience in other fields of journalistic enterprise that the success of a publication is always in proportion to its value to the classes it addresses, the conductors of *The Metallurgical Review* ventured the bold experiment of establishing a magazine of high scientific value and exceptional mechanical elegance. Its reception vindicated the wisdom of this liberality, and it enters the New Year with the assurance of a larger and more immediate success than even its conductors expected. As a journal of metallurgical science its importance is already widely recognized, and the demand for back numbers has already necessitated the printing of second editions to supply it.

Our arrangements for contributions are such that we can promise a steady increase in the value and interest of the monthly issues, and among the names of our contributors will frequently appear those of writers everywhere recognized as eminent authorities. Each issue will conform to the highest attainable standard of excellence, and its conductors are always ready to incur any expense which will increase its interest, usefulness or beauty.

Bailey's Improved Hydrant.

Messrs. Bailey, Farrell & Co., of Pittsburgh, have recently brought out a new style of hydrant, of which we give an illustration. In order to prevent breakage by frost or accident, the body of the hydrant is made of heavy wrought iron tube. To this tube there are top, intermediate and base ornaments attached, as shown in the cut. The hydrant valve is made of brass. The plunger is a mov-



ing water-way closing against the pressure. Repairs are easily made, as the valve can be withdrawn without the necessity of digging, a point of much importance, especially where a hydrant is set in a pavement or upon a lawn. The flow is closed before the waste is opened, and the waste before the flow, thus preventing wasting of water in the ground, a cause of much trouble in some styles of hydrants. A large cast-iron collar is attached to the bottom of the hydrant, which prevents the frost from lifting it out of the ground. To prevent obstruction from sand or mud accumulating around the waste passage, a large sediment chamber is provided.

The Future of England.

The following remarkable article is from the London Spectator:

The Medical Examiner publishes the odd fancy—odd, that is, for a professional journal—that our sanitary laws, now becoming so complex and so troublesome, may one day be studied as mere curiosities. When England is again, as she will be, an agricultural country, inhabited by 6,000,000 of sleepy tillers of the soil, the laws forced on us by overcrowding will, the Examiner thinks, no longer be necessary or regarded, except as matters of antiquarian medical curiosity. We fear that is a dream. They may no longer be necessary, any more than laws are necessary to compel Hindus to bathe or Mohammedans to keep sober, because the principles of sanitation may be willingly and almost instinctively obeyed, but the fact of England being a sleepy agricultural country, thinly populated, will not remove the necessity for sanitary laws. It was a sleepy agricultural country when the black death came and when the plague came, and epidemics still hit hardest in idyllic little villages. You would not find a sleeper place, or a more agricultural place, or a place more remote from city influences than Terling, in Essex, where a few years ago an epidemic caused by polluted water threatened to destroy the whole population, and did attack more than half of them. We very much doubt if Swiss cantons would not be improved by stricter sanitation, and if the first object of life were living, would rather take our chance in Marylebone than in Holstein or Hesse, which are just the sort of places the Examiner expects England to become. And if the necessity exists, and the consciousness of the necessity, the law, we may be certain, will exist too. The desire of the small community to be healthy will be like the desire of an aristocracy, and a death will affect a village as it now hardly affects a household. It was not in a great state that physical training was made perfect, nor were they a numerous people who most of all dreaded death.

We wonder if England will become like Holstein. At first sight, that would seem to be an inevitable destiny, and one from which it is as needless as hopeless to recoil. The special "pull" of this country in manufactures, the cheapness of fuel, must one day—say, within another two centuries—disappear, and then our principal means of accumulating wealth, the occupation of our race, will have departed. The factories will close one by one; the iron and coal mines will be shut up like the tin mines of Cornwall; the fires in the forges will be blown out; the ships will be laid up to rot; the railways will be limited to a few great arteries; rentals and prices will all sink; and the population, after one attempt to live on the realized wealth, which will then be enormous, will rapidly disperse to other lands. They will know geography well, they will have a traditional habit of stumbling about the world, and they will glide away to lands where nature is not used up and their predilection for accumulating can still be gratified. An emigration of a million a year will thin us down to the level the land can support, and bring a sudden excess of strength and energy, perhaps feverish strength and energy, to every land whose rulers speak the English tongue. Australia, Polynesia, the two temperate Americas—for the Spanish Creole and the Indian will have long since yielded to the Teuton—will be filled with the emigrants, who may even settle also, and, of course, rule, on the highlands of Brazil, and England will be left to

AMERICAN SCREW CO.,

Providence, R. I.

Manufacturers of

IMPROVED

Gimlet Pointed Wood Screws,

Patented

May 30,

1876.

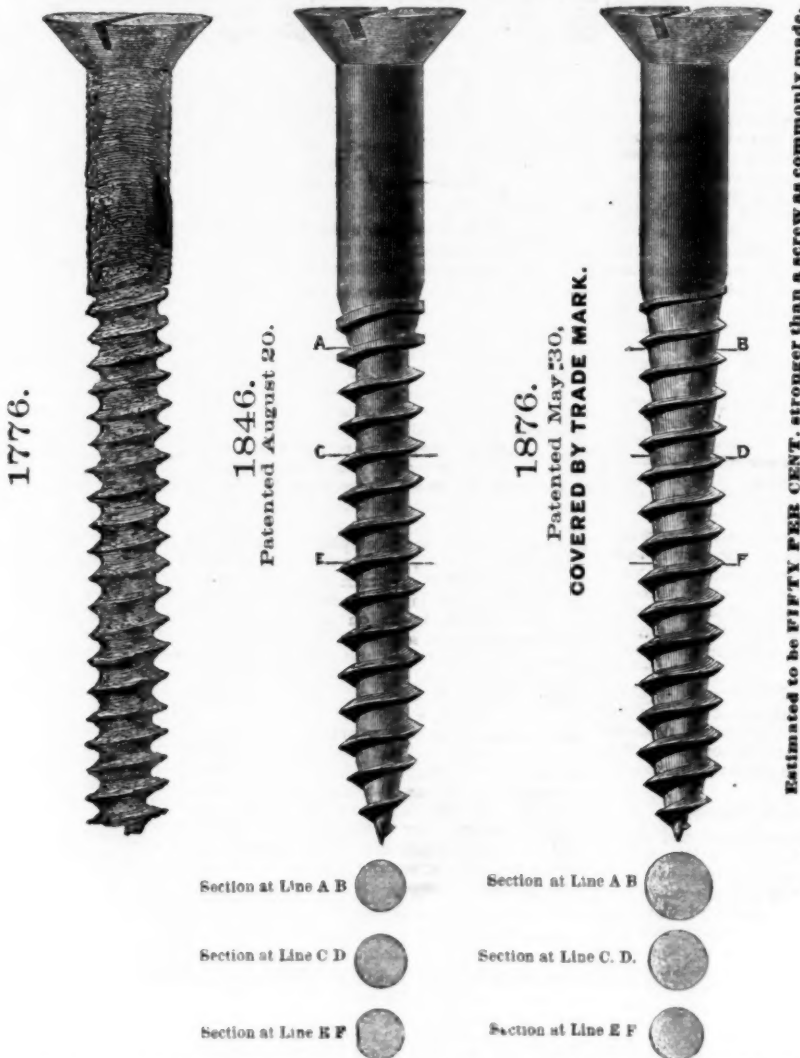


After forty years' experience we offer to the trade our Centennial Screw, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored boxes with new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

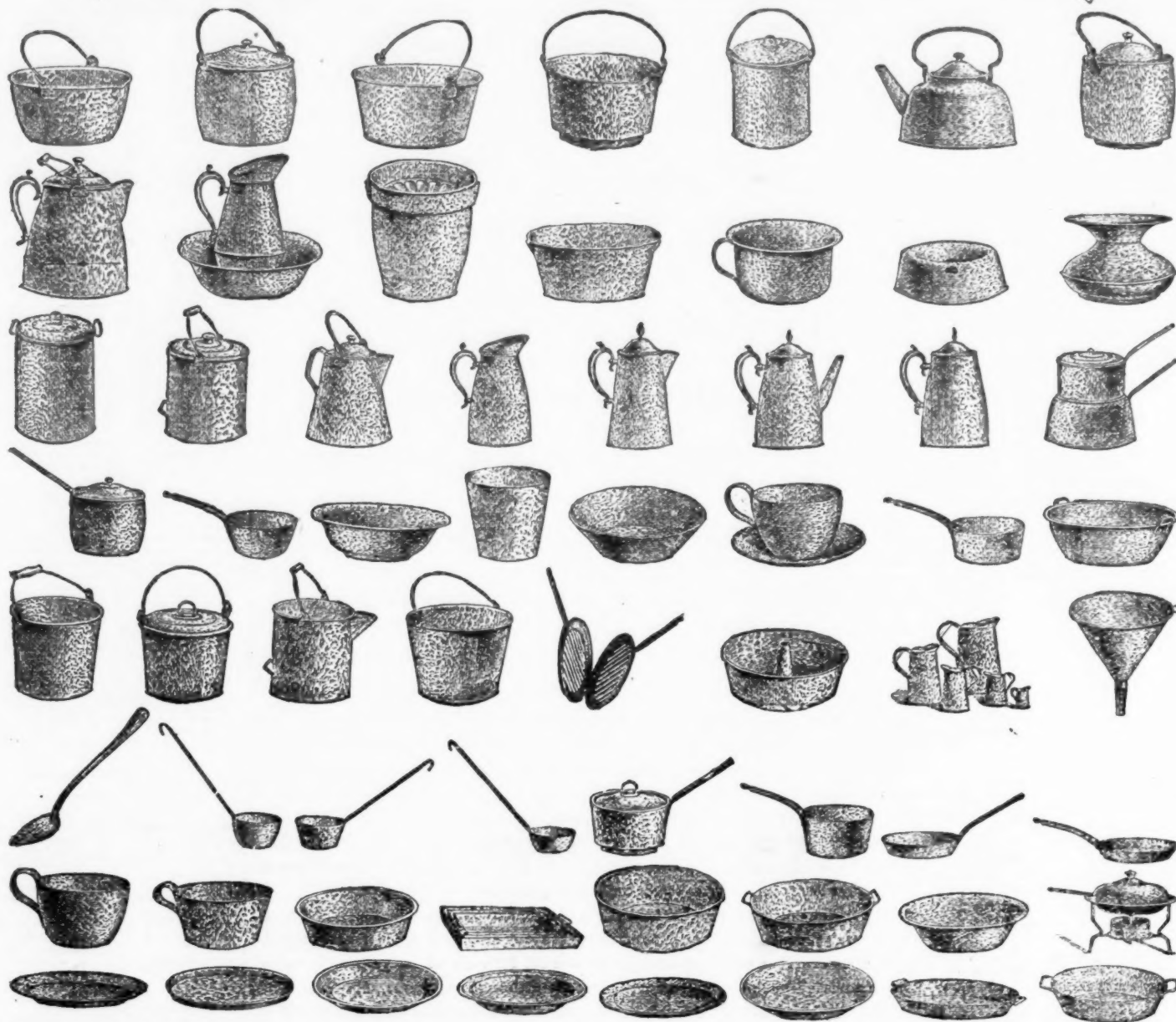
six or eight millions of agriculturists, mostly stock growers. London will be a huge Bruges, its suburbs fortunately decaying at once, from bad building; the great cities will decline to little boroughs, and the smaller cities will again be villages, and with all seas open the cultivation of corn will scarcely be a profitable occupation. England will be mainly grazing land, a huge park, as it were—you can see the thing in miniature in the strangely pastoral village of Millhill, not 10 miles from London—studded at long distances with sleepy, comfortable villages, pretty churches half disused, roomy old houses too grand for their occupiers, and ruins just made picturesque by the ivy and the creepers. It will be a strangely beautiful land, full of that softly undulating scenery which the eye permanently loves, rich with greenery and woods, and just wild enough not to suggest savagery, or solitude, or danger. Taxation will be light, for the debt will be gone, shaken off as beyond the new means; the throne will be gone, as too expensive and useless; and the country, organized as Switzerland, will be thinly peopled by a race with the hereditary habit of education, but few desires or opportunities of excitement. The inherent conservatism of the people—a conservatism as of Hindus—will have its fullest scope. The ambitious and the energetic will go elsewhere, for there will be nothing to do here, to return in the evening of life, as Scotchmen do, drawn back by the strong attraction of the restful, gentle, uneventful life within the endless park.

Indeed, England may be the country residence of the English-speaking, old and prosperous, from out of all the world. There will be much equality of mental condition, for education will have done its work for 200 years, and probably much equality of circumstance, for with the wealth of the country the plutocracy will have perished. The sense of leisureliness and the enjoyment of leisure will again be on the land. There will be no fear of invasion to distract the people, for over every local emblem will float the broad blue flag, the flag of the Anglo-Saxon Federation, which none may insult and live; and there will be much inclination to culture, to study, and especially to study of those feverish days when England was great, and revered and hated in every continent, and full of wealth, luxury and pauperism. But for the most part life will be somewhat bovine, the greatest occupation the manufacture of fine kine, the greatest interest the watching from a distance the throbbing life of the real world, the greatest pleasure the enjoyment of nature in the trees, the grass and the clouds.

There is nothing to regret that we know of in such a picture, for the race will be greater than ever—and what does its habitat signify?—and England herself, though her political being must be absorbed in that of the mighty federation, will remain the ancient mother of nations—perhaps regain, by a development of intellectual, or scientific, or theological power her prestige among mankind. Out of such a sleepy world as we have sketched came the greatest English man and woman—Shakespeare and George Eliot—and why should the old conditions not produce the old effects? It was after dominion perished that Italy conquered art, and threw far and wide over mankind the enduring papal chain. But will it go so? Possibly it will. There seems to be some instinct in the popular mind that it will, for the curious prediction that England is becoming a larger Holland has been repeated until it has obtained a general acceptance. There are far-sighted statesmen, too, who think it will, and one of them even founded upon his belief an appeal to Parliament for aid in his effort to pay off the national debt. And yet it may all go so very differently. So much will depend upon the character of the rulers of that day, and so much more upon the temper of the nation, when the necessity of perishing in poverty or of departing in peace is once perceived. It is a very good people, no doubt, the English, good and good-humored, when not too much pressed; but there is a terrible Berserk streak in it for all that, a readiness, if the worst comes to the worst, to adopt the only truthful aristocratic motto, that of the Earls of Cranston, "Thou shalt want ere I want." The writer once saw the Berserk side of the national character let loose in the reconquest of India, and failed to see any trace either of indecision or of scruple. We could conceive of the forty millions of Anglo-Saxons cooped up in an island too small for them, pressed on their tenderest point, their capacity of money getting, and aware that they must change their situation or let English history end, bursting out, not as emigrants, but as conquerors, and founding not new colonies, but new empire, held together by strong military organization, and worked not for the benefit of the world, but of the island. We could conceive of their telling the world that they must have more room, and taking it with a strong hand, deciding that they, for example, and not the Portuguese, would hold and govern and populate Brazil, or even in their exasperation using their last wealth to conquer a considerable portion of southern Europe. There is nothing in the national character to make that form of the euthanasia impossible, and a good deal in the national history to suggest it. France was conquered by Henry V because the English nobles felt "there was not room in one little island for them all." The German chiefs are always taunting us because we do not make the army continuous with the nation, but whether they would like the British nation turned into an army is not by any means so certain. England hungry, despairing of the future, but with her accumulated wealth still undispersed, might accept the fate of absorption into her kindred nations; but she might also become the most aggressive and the most dangerous power in the world—might, for example, choose to make it her business and work in the world to govern Asia, not merely to keep up the Roman peace, as she does in India, but to govern the continent in the full meaning of the word, taxing it in compensation for the benefits she conferred. A slow and gentle decline is possible, but we are the children of Odin, and it was not thus their instinct told them to die.



PATENT GRANITE IRONWARE.



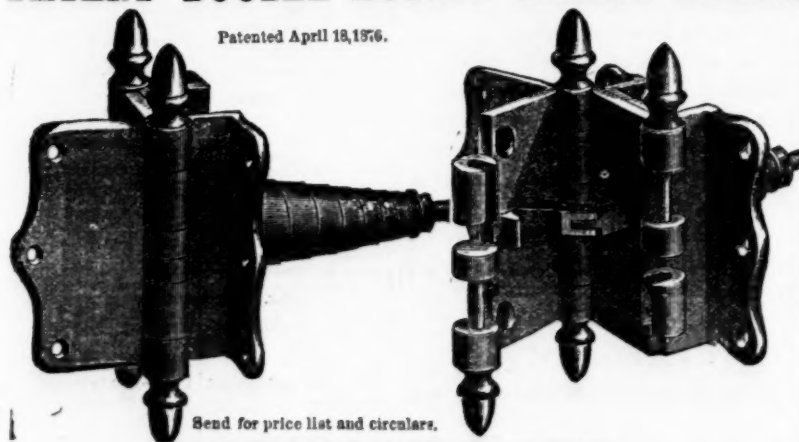
Many dealers have feared that the **Ware** would last too long, and have therefore allowed others to take the trade, but since the Goods are made of Glass and Iron, and not of the nature of rubber goods (which would be a calamity to the trade), our swift American Housekeepers will find a way to wear them out and thus make room for more. There is certainly a good profit to be made by selling Granite Ironware.

Yours truly,

ST. LOUIS STAMPING CO. St. Louis, Mo.

PATENT DOUBLE ACTING SPRING BUTTS.

Patented April 18, 1876.



Send for price list and circulars.

FOR SWINGING DOORS BOTH WAYS.

These Butts are the first ever constructed with two leaves only, and with hinges attached thereto for fastening to the door and casing, thus rendering them much more substantial and easy to put on, as the screws are all driven from the outside. By means of the hinge the door is hung truly to the casing, instead of to a strip as is the case with all other double acting Butts, and the screws do not become loose, as the strain on them is much less. On the back of the Butt is a powerful coiled spring, and draws in direct line with the center of the door, thus holding the door firmly in position, and obviating all sag. Our price list is from 25 to 40 cents, lower than others. Manufactured by THE SABBIN MFG. CO., Henspelier, Va.

Improved Gem Coal Hods.



Heinz, Pierce & Munschauer Buffalo, N. Y., Manufacturers.

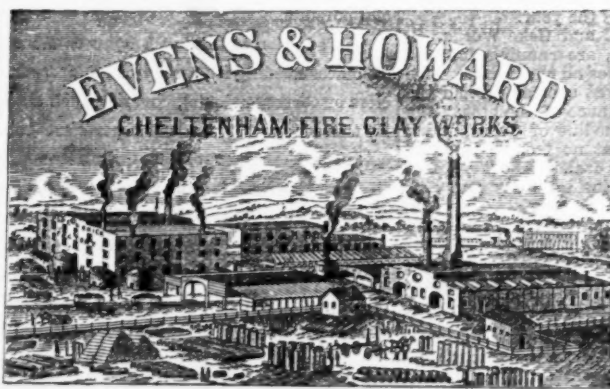
We have perfected our "GEM" Coal Hod for the trade of this and can now recommend it to our customers as an article that will supply a want long felt, viz: A Coal Hod that will not spill the coal while being emptied, either on a grate fire or in any kind of a stove. Our "Improved Gem" Hod works to perfection in this respect, having a "free" and "easy" discharge of the coal. They are made in five sizes, Japanned, Bronze Band and Galvanized, at the following net prices:

	Japanned.	Bronze Band.	Galvanized.
15 inches, per dozen	\$2.50	\$4.50	\$6.00
18 " "	3.25	5.50	6.50
20 " "	4.75	5.50	7.25
22 " "	5.25	6.25	8.00
24 " "	7.00	8.25	10.00

NET PRICES.

Special discount made for quantities on application.

The following houses are wholesale agents:
HAMILTON & MATHEWS, Rochester N. Y.; MCCARTHY & REDFIELD, Syracuse, N. Y.; MYERS, Osborne & Co., Cleveland, Ohio; CHASIN BROTHERS & CHANDLER, Chicago, Ill.; J. MACLAY & Co., Dubuque, Iowa; SICKLES, PRESTON & Co., Davenport, Iowa; DEANE & DAYTON, Burlington, Iowa; JOSEPH SCHMIDT & Co., 51 Beekman Street, New York.



City Office and Depot, 916, 918, 920 Market Street, ST. LOUIS, MO.

MANUFACTURERS OF FIRE BRICK, GAS RETORTS, BESSEMER TUYERES, FURNACE LININGS, RETORT SETTINGS of Every Description.

Dry Milled Fire Clay, Fire Sand, Ground Fire Brick in barrels and bulk, Fire Clay
Sewer Pipe, Heat Pipe, Chimney Tops, Flue Linings, Drain Tile, &c.

J. J. Shannon
1707 Market St.,
PHILADELPHIA.

MARTIN'S ENGLISH HORSE CLIPPERS.

Recommended as
the best Hand Clip-
per made.
\$5.00 each. Dis-
count to trade.

**NORTH'S PATENT
Universal Lathe Dog.**
It is very strong. Holds very strong. Will not
deface finished work. Holds round, square or ir-
regular work. Always stands up square with the
work and will not "skew." Is more evenly bal-
anced than the common dog.
Send for circular.
SELDEN G. NORTH, No. 440 North 12th Street, Philadelphia, Pa.

**B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,**
Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.

The largest stock of Fire Brick of all shapes and
sizes on hand, and made to order at short notice.
Cupola Brick, for McKenzie Patent,
and others. Fire Mortar, Ground Brick, Clay and
Sand. Superior Kaolin for Rolling Mills and Found-
ries. Stone Ware and other Fire Clay and Sand,
from my own mines at New Jersey and Staten Island,
by the cargo or otherwise.

NEWTON & CO.,

Successors to

PALMER, NEWTON & CO.,
ALBANY, N. Y., Manufacturers

FIRE BRICK Stove Linings, Range and Heater Linings Cylinder Brick, &c., &c.

Watson Fire Brick Manufactory

ESTABLISHED 1836.

JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturer of

FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries,
Gas Works, Lime Kilns, Tanneries, Boiler
and Grate Settings, Glass Works, &c.

FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK And Furnace Blocks DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay Retort Works,

Manufacturers of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY

Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1849,

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, etc. Miners and
Dealers in Woodbridge Fire Clay and Sand, and Staten
Island Kaolin.

Cumberland Fire Brick Works.

GARDNER, STUART & CO.,

Manufacturers of

STANDARD SAVAGE FIRE BRICK.

OFFICE:

Room 3, No. 56 1/2 Fourth Ave., Pittsburgh, Pa.

WORKS:

One mile from Mt. Savage Junction, Md., B. & O. R. R.

Illustrated Circulars and Price Lists on application.

Brooklyn Clay Retort

AND

FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Ga-
House and other Tile, Cupola Brick, &c. Dealers in
and Miners of Fire Clay and Fire Sand. Clay bank at
Burt's Creek, New Jersey. Manufactory: Van Dyke,
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.
Office: No. 88 Van Dyke St.

MANHATTAN FIRE BRICK

and Enamelled Clay Retort Works.

ADAM WEBER, Proprietor.

Office: 633 E. 15th St., N. Y. Clay Retorts, Enam-
elled for Gas Houses: Retorts for burning raw bone and
re-turning bone for Bone Black. Fire bricks, Fire
Blocks, Cupola and Range Bricks of all shapes and sizes.
The best fire clay from my own clay beds at Perth
Amboy, N. J.

A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

FIRE BRICK

of reliable quality for all purposes, manufactured of
the best New Jersey Fire Clays. Also, Architectural
Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire
Brick and Diamantine Building Brick.

Eagle Plumbago Co.

Crucible, Lubricating, Electrotyping, Stove

Polish, and other grades of

PLUMBAGO,

FOR SALE BY

CONGREVE & SANDERS, Sole Agents,

104 & 106 John St., New York.

STROBEL & WEISBRUD

DESIGNERS

AND

ENGRAVERS WOOD

ESPLANADE BUILDING

SE Cor 5th & Walnut Sts

CINCINNATI O.

INDUSTRIAL ITEMS.

MAINE.

Manganese has been discovered at Dover and sent to Katahdin Iron Works to be used in reducing the iron ore. A New York chemist has been at Dover making some investigations.

VERMONT.

The Saranac Horse Nail Company, Vergennes, are driven with orders, having to run extra time to supply the demand for their make of nails. Orders have been given for 10 more machines, which are to be completed as soon as possible, and will enable them to fill orders more promptly in the future. The old National Horse Nail Company are also running extra time, frequently day and night. Their brand of nails are well known wherever machine-made nails are driven. They have recently added to their machinery new and ingenious finishing machines, which roll and point the nails at one operation and add very materially to their appearance and quality.

MASSACHUSETTS.

Twelve thousand sewing machine needles are made daily at the Domestic Needle Works, Middleboro. Fifteen thousand per month are sent to Australia.

C. H. Brown & Co., of Fitchburg have just shipped the twentieth engine which they have made this year. It is of 200 horse power with cylinders 24 inches in diameter and 48 inches stroke. It was built for the Eagle Rubber Company of East Cambridge. An engine of 150 horse power will be completed this week.

The iron manufacturing establishments at Wareham are all busy, and indications point to a continuation of activity throughout the winter.

CONNECTICUT.

The edge tool factory at Cheshire, formerly known as the Rugg Manufacturing Company, but at present nameless, is now idle, but will, it is reported, resume work on the first of January under new management.

The works of the Candee Rubber Company will be rebuilt at once at New Haven on land adjoining their old site. The company are only employing 90 hands in the Middletown factory.

The Howe Machine Company are shipping to-day 900 machines complete to Lima, Peru, the largest order they have ever sent there at any one time. The trade of the company is improving in that country every year.—*Bridgeport Standard.*

Another new locomotive for the Consolidated road has been commenced at the railroad shops in New Haven.

The New Britain Bank Lock Company, heretofore carried on by Mr. F. H. North, is now organized as a stock company, with Mr. Oliver Stanley as secretary and treasurer, and he will have chief control of the business. The locks manufactured are very superior and have an excellent reputation among bankers and others.

NEW YORK.

The following is the total amount of iron ore, bloom and pig iron cleared at the collector's office at Whitehall during the years 1876 and 1877:

	1876.	Tons.
Iron ore.....	182,029	
Pig iron.....	14,382	
Bloom iron.....	6,408	

	1877.	Tons.
Iron ore.....	200,107	
Pig iron.....	13,413	
Bloom iron.....	8,574	

Lumber, a slight decrease from 1876.

The following is a statement of the quantity of anthracite and bituminous coal passing through the Champlain Canal into Lake Champlain, destined for the States of New York and Vermont and Canada, respectively, during the years 1876 and 1877, as appears by the books at the collector's office at Whitehall:

	1876.	Tons.
For Vermont, anthracite.....	49,577	
" bituminous.....	2,393	
New York, anthracite.....	534	
" bituminous.....	74,554	
Canada, anthracite.....	91,451	
" bituminous.....	436	

—*Troy Daily Times.*

NEW JERSEY.

The Passaic Machine Works, Watts, Campbell & Co., Newark, have recently completed a massive engine of 450 horse-power for the steel works of Benjamin Atha & Co., of Newark; also one of 300 horse-power for John N. Stearns & Co.'s silk mills at Forty-second street, New York city. The latter is fitted up with the Corliss valves. This firm also build all grades of sugar refining machinery and ship largely to Cuba, and they are now at work on an immense steam plow for use on a Cuban plantation. They are making a lathe capable of turning a wheel 30 feet in diameter and 8 feet face. They have turned out of their works during the last three weeks over 250 tons of manufactured machinery, and have many orders on hand, among which are several for Corliss engines.

Among the active and progressive firms of Newark, are Edwards, Burton & Dovey, known as the Phoenix Lock Works. They are all young men, who started in the business of lock manufacturing in 1873, without large capital, but with a good knowledge of the business and lots of pluck. Last year they made about 50,000 dozen trunk and cabinet locks of all sizes. They have pushed their goods into all markets, and will be soon compelled to increase their present capacity in order to supply their growing trade. They also manufacture escutcheon pins, rivets, French wire nails and general trunk hardware.

Benjamin Atha & Co., Newark Steel Works, are busy and have been running constantly during the past four years of widespread business depression. They now employ a force of 120 hands, making all classes of steel rods and bars. Their specialties, however, are steel for files, taps and dies and other tools. Their product the past year has been about 2500 tons, and they are now making additions which will increase their capacity to 3000 tons per year.

The New Jersey glass factories will be operated to their fullest capacity during the winter, as the manufacturers have received heavy orders for wares that will require a long time for their production.

PENNSYLVANIA.

The Mt. Vernon ore mines are reached by a narrow gauge road leading from the Mt. Pleasant Railroad; the distance is about three miles from the latter road. The ore is known as the "big bottom," which is used at the Scottsdale Iron Works. There are 8 drifts, with rooms leading off, from which the ore, ranging from 6 to 15 inches, is taken. Powder does the work here. When the miner is ready, he drills a hole into the solid ore, and the report of the blast is very slight.

The Dexter Mine, J. R. Stouffer & Co., operators, is located on Mt. Pleasant Railroad. These works are well known and have been more than once the subject of special mention through the press. There are 40 ovens fired up, and the coke is shipped to various parts of the U. S.

The iron molders of Drexel, Rapp & Co., Reading, have gone out on a strike. The cause was a slight reduction made in the molders' wages. The places of the strikers were immediately filled by new hands, and work goes on as usual. The firm manufacture all kinds of pulleys, hinges, bolts and small hardware of that description.

The case of the men charged with rioting, &c., at an iron mill near Norristown, is closed. They were indicted for unlawful assembly, riot and assault and battery. Four were convicted of riot and assault and battery. Three were convicted of riot, and one was acquitted.

The Clara Furnace, New Castle, owned by the Crowther Iron Company, has been "showing off" as follows:

	Tons.
Week ended Oct. 26.....	409
" Nov. 2.....	444
" " 9.....	426
" " 16.....	425

being a total of 1714 tons for the four weeks. The product was Bessemer metal, and the size of the furnace is 15½x60 feet.

Sharon's mills and furnaces are running steadily, with fine prospects of continuing so. The Keystone Furnace Company, Reading, having been among the first, some three or four years ago, to adopt the "Weimer Combustion Chamber," under the boilers of their No. 2 furnace, have concluded to place similar chambers under the boilers of their No. 1 stack.

For the week ending the 15th inst., the Millerstown Iron Company at Macungie, produced 212 tons of No. 1 iron, and on the 15th, to start the coming week, a cast of 12 tons of the same quality was made. The furnace has been making over 200 tons per week for many weeks, which would not be considered a large production were the iron not of the best quality.

Messrs. Benson & Cottrell, proprietors of the Donegal Furnace at Marietta, Lancaster county, started up a day or two ago, and in 10 days expect to make the first blast. This will give employment to a large number of hands.—*Reading Times and Dispatch.*

The first cast made at Leesport Furnace, on the 9th inst., of about 5 tons of iron, was the quickest time ever made in that furnace to produce iron so soon after the blast was put on. It generally took 30 to 35 hours before the first casting could be made, but on this occasion it was made in half the time. This furnace is now in full blast and works finely.

The New Brighton Novelty Works are shipping bootjacks and coffee mills to London.

The Knauertown Forge, Warwick, Chester county, is being run to its fullest capacity and kept going night and day. An excellent quality of blooms is being made.

The furnace of the Pottstown Iron Company, the fires of which were re-lighted last week, is working admirably.

The large 22-inch rolls in the Pottstown Iron Works, broke on Monday, the 10th inst. The top one broke in the middle and the lower one at the collar. The break will necessitate the stoppage of that portion of the works for some days. It will not be put in operation again until the first of the year.

West Overton Coal and Coke Works, A. S. R. Overholt & Co., are running full and find a ready market for all their coke. The firm have 62 ovens fired constantly, and the coke has the appearance of the best. The coal mine is just at the line of ovens, and a visit convinced us that no trouble is experienced in mining the coal. About 7½ feet is worked out. The inside is dry and ventilation good.

Strickler & Lane, whose coal and coke works are on the Mt. Pleasant Railroad, have stuck good coal. They have as pretty a mine as is to be found in this region. Work out about the same thickness of coal, but the manner in which it is mined, and the accuracy of the rooms and headings, make these works superior to many others, so far as safety is concerned. The mine is dry and well ventilated; 44 coke ovens in operation; the coke is prime, and is shipped to various points in the United States.

Emma Mines, near West Overton, Isaac F. Overholt, owner and operator, are operated similar to those near Connellsville. The coal is the same. Thirty-six ovens are used in burning the coke, which is as good as any. It is mostly shipped to Michigan.

PITTSBURGH AND VICINITY.

Wm. Maxwell & Co., manufacturers of convex photograph glasses, glass labels, fancy paper weights, etc., are busy on eastern orders. One firm in New York takes all the photograph glasses they can turn out. This is a new industry in Pittsburgh.

The Shoenberger Furnace that has been in blast for some months, was blown out a few days since, and the other blown in in its place.

The Soho Furnace has been doing admirable work since it was blown in under its new manager, Mr. Antony Kloman. The lines of this furnace are different from any in this section, and on a new principle. Its work will be watched with interest.

The Westinghouse Air Brake Company received, the 13th inst., another large order from Europe, by cablegram, for "air brakes." This is in addition to the orders from Belgium and France, previously

ESTABLISHED 1849.

INCORPORATED 1876.

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The forty-second semi-annual volume of our *Book of Reports* is now being prepared, and will be issued January 7, 1878. We intend that it shall be more complete in its classification, more comprehensive in its scope, closer and more conservative in its estimates of responsibility and credit, than any previously issued.

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While the object of our Agency is so well understood and so thoroughly appreciated as not to require a more extended notice at this time, we particularly desire to call attention to that important department which we have brought to a greater degree of perfection even than that of the publication of our *Book of Reports*, viz:

DETAILED REPORTS.

For the further development of this important branch of our business, not only do our special reporters visit the various cities and villages in the district assigned each office, and carefully revise the reports already on record, writing also fully of those who have recently commenced business, but our correspondents are established in every town and hamlet, and are constantly advising us of the changes in the condition of all engaged in commercial pursuits.

In addition to this, each office in the whole connection is required to transmit daily (to offices needing it), a copy of all information received by them (either from their travelers or correspondents), covering such trades as seek credit in other than local markets. By this system thousands of reports are being constantly interchanged (the average received by the larger offices during the past year having been more than 1500 a day), the majority reaching their destination within ten days from the time of leaving the correspondents' or travelers' hands. The value of this daily reciprocation having proved so great, and been so thoroughly commended by our patrons, we feel that we have touched the key-note, and that in future we shall anticipate the wants of all who need and seek information influencing commercial credits, whether of the local trade or that in the remotest places in the United States and British Provinces.

To our Subscribers we furnish:

1. The use of two volumes of our *Book of Reports*, carefully revised, and issued four times each year, giving the name, business, estimated worth and credit of Merchants, Manufacturers, and Banks in the United States and Dominion of Canada. Also, at a small additional cost, Pocket Editions of single States, for the use of Commercial Travelers.
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 5. The Address of well-recommended Attorneys, throughout the United States, who collect and attend to other legal business, at reasonable rates.
 6. A Letter of Introduction, to enable them to receive the benefit of the Records of any of our Offices in the States represented in the volumes loaned, which, in conjunction with the Pocket Editions, are of great benefit to Commercial Travelers.
- Relying solely on the merits of our work, we respectfully solicit an examination of our system, with the assurance of our ability to substantiate all we claim, and with the knowledge that it is worthy of your earnest consideration.

CHARLES F. CLARK, President.

New York, Dec., 1877.

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PREFACE.

In ten years spent at molding and in the foundry business, and four years in traveling through the United States, in introducing a chemical flux for iron, I have seen the lack of regularity, and the bad effects of it, in the construction and management of foundry cupolas and furnaces, and the want of a guide or rule for their construction and management. At the earnest solicitation of many foundrymen, I have undertaken the publication of this small work, with a view of throwing some light upon the subject of melting iron, and the construction and management of cupolas and furnaces—a subject that always seems to be enshrouded in mystery.

All the theories that I have advanced in this work are from notes taken from practical observation while visiting different foundries, in the flux business, and from a chemical knowledge of the laws of combustion and heat, as well as of the laws of chemical affinity of one element for another. By giving a few explanations of causes and effect I hope to establish some regularity in the melting of iron for foundry purposes.

I have also added a few recipes for the forming of alloys, and a general description of all the metals, minerals and gases used in the art of founding, as well as their application, all of which I have endeavored to place before the reader, clothed in popular language, so that all who can read may fully understand this interesting subject; for this reason, I have endeavored to avoid using any of the chemical and technical terms which are usually applied to this subject, as they often have a tendency to embarrass, rather than to enlighten, the reader.

THE AUTHOR.

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The working surface is in one piece of JESSE'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The horns are covered with and its extremity made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is warranted to be thoroughly welded and not to come off.

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No.	Weight	Price
1	10 lb.	\$2.25
2	15 lb.	\$2.75
3	20 lb.	\$3.25
4	30 lb.	\$4.25
5	40 lb.	\$5.25
6	50 lb.	\$6.25
7	60 lb.	\$7.25
8	70 lb.	\$8.25
9	80 lb.	\$9.25
10	90 lb.	\$10.25
11	100 lb.	\$11.25
12	125 lb.	\$14.25
13	150 lb.	\$17.25
14	200 lb.	\$23.25
15	250 lb.	\$29.25
16	300 lb.	\$35.25
17	350 lb.	\$41.25
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reported. The present order is from the London, Brighton and South Coast Railway Company for 50 sets of engine fixtures and 500 sets of car fixtures, amounting to a trifle over \$85,000 in gold.

The office of the Jacobus & Nimick Manufacturing Company has been removed to the corner of Wood street and Sixth avenue, in the Bank of Commerce building.

B. W. Baldwin, Pittsburgh, manufacturer of carbon bronze, has recently received a report from St. Louis that his car bearings have already run under heavy sleepers 71,000 miles, with a prospect of running many thousands miles more. Bearings of carbon bronze have been furnished by him for railroads in this vicinity as well as abroad for the past four years. We understand none have yet been reported worn out.

The Pittsburgh Bolt Works, Tomlinson, Lynch & Co., are to be sold for taxes.

The Shovel and Saw Works, at Beaver Falls, are full of orders.

On December 3d a new gas well was struck at Beaver Falls at 1050 feet, the largest ever developed in the country. It is of sufficient capacity to generate steam for from 300 to 400 horse-power, and its estimated value is \$25,000. The cutlery works have now in operation about 20 heating furnaces using natural gas from wells. Ultimately the entire works of the town will be run by natural gas, and every dwelling heated and the town illuminated.

The works of the Dexter Spring Company, at Hulton, manufacturers of carriage springs, are running to their full capacity.

On the late rise in the rivers, W. H. Brown & Co. dispatched to the lower markets 1,813,500 bushels of coal and 315,224 bushels of coke, in boats and barges towed by 11 steamboats. This is the largest shipment of the kind ever made by one firm on a single run from this port. The next largest, 1,084,000 bushels, was made by the same firm some years ago.

Shoenberger, Blair & Co.'s furnace is acquiring a record worth having. The furnace has a 5-foot hearth, 13-foot bosh and is 60 feet high. During four consecutive weeks it has turned out 127 tons of first-class iron. The first week it turned out 420; the second, 441; the third, 414; and the fourth, 443.

WEST VIRGINIA.
The Whittaker Mill, Wheeling, has gone back to single turn for the present.

The Central Glass Works, Wheeling, are arranging to transfer coal over the creek from the bank opposite their works by means of a slide and wire rope.

The strike at the La Belle ended Dec. 11, all the feeders excepting fourteen, who were shut out, returning to work.

By the breaking of a pulley at the tack factory, Wheeling, Dec. 12, about two-thirds of the tack machines will be thrown off for a few days. The apparatus will be repaired and work resumed by the latter part of the week.

The Hinge Factory, Wheeling, shut down on the 13th for repairs. It will in all probability remain closed until after the holidays.

The Peabody Insurance Company have disposed of the nails sunk in the barge Giant, recently, at Wheeling, to F. W. Habbizell, of Madison, Ind., for \$1.25 per keg. Men have been employed in getting out the nails, and have succeeded in saving 800 kegs so far. The high water has stopped the work at present, which will be resumed as soon as the river falls.

There is some talk of the old Washington Mill being converted into a glass factory by a company made up of Pittsburgh and Baltimore parties. The plan spoken of proposes that the Drakely heirs, who own the property, put in the building and coal, and the Pittsburgh people furnish the balance. Most of the implements used by the old company have been sold off at a great sacrifice.—*Wheeling Standard.*

We condense from the *Wheeling Intelligencer* the following statement of the condition of affairs at the iron and glass works in that city and vicinity: Top Mill—475 men; fullest capacity; fair demand for nails. Top Mill Blast Furnace—still out waiting for completion of railroad. Riverside Mills—both fullest capacity; 653 hands; fair demand for nails. Riverside Furnace—in blast since January 1. Belmont Mill—double turn; 450 hands; demand for nails better than last year. Belmont Blast Furnace—will go in blast about February 1. La Belle Mill—fullest capacity; 250 hands; demand for nails fair. Benwood Mill—full capacity; 500 men; business not so good as last year. Benwood Furnace in blast. Crescent Mill—making sheet iron only; 200 hands. Aetna Mill—double turn to fullest capacity; 350 hands. Washington Mill—all portable property sold at auction week or ten days ago; real estate is offered at private sale. Arlington Stove Works—full force of 70 men extra time; business better than at same time last year. Star Foundry—full force of 40 men on full time; business never better. Center Foundry—business very dull; only half force (15) employed. Foundry of Spence, Baggs & Co.—working to fullest capacity. Superior Machine Works—business moderate; 40 men at work. B. & O. Shops—business very slack; 125 hands at work. Hobbs & Taylor's Machine Shops—business very dull; only three or four hands at work; 20 to 25 in flush times. Central Glass Works—full time; 350 hands; business better than at this time last year. Hobbs, Broekunier & Co.'s Glass Works—full capacity; 416 hands; demand better than last year. La Belle Glass Works—200 hands; full capacity; behind orders; 90,000 lbs. goods made every week. Belmont Glass Works—full capacity; 80 men; October sales, \$20,000, biggest ever made in same time. Excelsior Glass Works—idle about a year. Hinge Factory—full capacity; 140 men; business better than ever before. Norway Tack Company—30 hands four days a week; time restricted by agreement with other manufacturers. Thos. Moorshead & Son, boiler makers—6 or 8 hands; three years ago twice as many. Belmont Agricultural Works—advertised for sale.

OHIO.

The Ohio City Mill at Martin's Ferry is to be sold on January 5. It was appraised a few days ago at \$50,333.

The prospects of the removal of the Canton Bridge Works to this place are flattering. A large portion of the stock has been subscribed. Those who are working up the

project have the means and are determined it shall not fall through. The works will probably be located below Booth & Miller's foundry, on the flats.—*Youngstown Register and Tribune.*

Work is being pushed forward rapidly at Andrews Brothers' Furnace, at Hazleton. The boilers, which were 30 feet in length, are being lengthened to 50 feet. It is expected that this furnace will blow in about the 1st of January.

Ohio Furnace Company have bought about 100 acres of wood from the Dempsey place, below the Rock. There are about 4000 cords in the tract and the company are now having it cut. Wood choppers are paid 35 cents.—*Ironton Register.*

The Belfont Iron Works Co., Ironton, has received a large quantity of Missouri ore.

Martin, Henderson & Co., Hanging Rock, have been making about 45 stoves daily, for the past three months.

The Revolving Scraper Co., at Columbus, have sold over 5000 revolving scrapers to township trustees in Ohio during the past year. Their works are still running full, and will probably continue so all winter, as they expect an increase of business next year. This scraper is meeting with great favor wherever introduced, and is destined to have a very large sale whenever it becomes known. There is no machine within the scope of our knowledge that has met with more rapid success.

Messrs. Royce & Pulling's machine works, formerly known as the Franklin Machine Works, are running nearly full; the foundry is idle at present, but will be put in operation in the early spring.

The Columbus Elbow Company have done a very heavy business this season; had they not largely increased the capacity of their works in the early part of this year, they would have fallen very far short of filling the orders which have been coming in during the fall months.

Messrs. P. Hayden & Co., of Columbus, are manufacturing a cotton tie of a new and very much improved pattern; they call it the "Ribbed Tie." They have large orders ahead for this tie. Their mills are running full and crowded with work.

In one of the heats, on Thanksgiving morning, at Brown, Bonnell & Co.'s Mill, Youngstown, Thomas Williams and James Hancock turned out from a charge of castings, 2410 pounds. This is claimed to be the heaviest heat ever made in this valley.

The Taylor Company, of Cuyahoga Falls, manufactured 11,400 square yards of wire cloth last month.

Messrs. McConaughy & Parker, a new firm in Akron, are now engaged in refitting and enlarging a frame building situated near Lock 2, and intend soon to occupy it as a novelty and general repair shop. The manufacture of a combined cut-off and strainer for cisterns, and tinners' shears will receive particular attention. The machinery which will soon be in readiness to be placed in the new shop will be run by water power, and workmen are now engaged in preparing for a water wheel, which will soon be put in place.

The unexpected assignment of Ballard, Fast & Co., coming so soon after the death of Mr. Fast, has caused considerable excitement in Canton.

The Cleveland Hardware Company have received their second order from Dublin for their manufactured shears.

Messrs. Hotchkiss & Gaylord are running their works on the corner of Carter and Girard streets on full time, manufacturing machine, bridge, track, plow and elevator bolts, coach or lag screws, bolt ends, &c. Fifty men are employed. New machinery is about being put in, enlarging their capacity for business.

H. & F. Blandy, of Zanesville, shipped recently two portable engines of their manufacture to Emperor Dom Pedro, Brazil.

The manufacture of steel wire for the great East River suspension bridge, New York, still continues. The old mill of Wharton & Co. has been leased by Anderson & Passavant, which is run to its full capacity, manufacturing the wire rods exclusively, in addition to the works of the firm on Ross street. The new works on Second avenue are also ready for operation. It is a very interesting sight to witness the rolling of these rods, but the general public is prohibited from entering the mill. About two car loads of wire is turned out each day. It is said that the contract will keep the mill busy for one year.

The Pittsburgh Chain and Car Link Company sent an order of several tons of their chains to St. Louis lately.

We clip the following items from the *South Cleveland Advocate*: The old wire factories are working all machinery to full capacity. It is in contemplation to build a large water tank for the steel works. No. 2 Blast Furnace is now making upward of 50 tons per day of No. 1 iron. No. 1 blast furnace was fired up on the 6th. The blast was put on the following Monday. The two new boilers of the new wire factory are manufactured from 36 Siemens-Martin steel. Several fine wire frames are running double turn, in order to keep up with orders. Machinists employed in the machine shop in connection with the wire factories, are working overtime in order to get the fixings ready for the new factory. Five double fine wire frames, each containing 32 blocks, have already been fixed up in the new wire factory, and are ready for work just as soon as the steam horse begins to pant. A new water tank, 8 feet high by 12 feet wide and 16 feet long, to hold 256 barrels of water, English imperial measure, is now being made at the boiler shop. This tank is to be placed on the roof between the two new wire factories. The new boilers, 15 feet long, 6 feet in diameter, containing 77 flues, are being made in the boiler shop under the superintendence of Mr. McKenzie, for the new wire factory. They are now ready to be transferred to the wire factory and will be set without delay. There is no foundation in the rumor that the Cleveland Rolling Mill Company are making arrangements to run the Emma Blast Furnace at the Union crossing. The company are now making preparations to roll nail plates, which will be taken to another establishment they are fitting up in the city, and there cut into nails. Some of the machines are already erected under the superintendence of an

Englishman who has had experience in the business of manufacturing nails. Three very large cog wheels, to be used in connection with the sliding crab of the Blooming Mill, have been cast at the Siemens-Martin Steel Furnace this week, one of which is now in the machine shop being prepared ready for work. We learn it is the intention, when the rail mill stops at New Years for repairs, to take out the iron wheels and replace them by these steel ones just cast.

MICHIGAN.

Shipments of ore by lake have entirely ceased.

The Carp Furnace will shortly go out of blast for necessary repairs. It is the intention, however, to make the repairs as speedily as possible, and relight the fires for a winter's run.

A new corporation, to be known as the Kimberly Iron Co., is being formed, based on some 10,300 acres of iron lands purchased in 1872, by Geo. C. Reis, trustee. The Co.'s lands embrace choice selections in Marquette and Menominee counties, and are believed to be quite valuable.

Two new coal mines will be opened here next spring, one by an Ohio company, the other by a Lake Superior company. By May next it is expected that at least 500 miners will be at work in the mines.

The silver smelting works, Wyandotte, having run entirely out of coke, and nearly out of ore, have shut down for two or three weeks.

In the Circuit Court, Tuesday morning, S. L. Potter, W. H. Bronson and T. C. Owen, as trustees, filed a bill of foreclosure proceedings against the Wyandotte Rolling Mill Company, having been requested so to do by a majority of the bondholders. It will be remembered that this bonded indebtedness was created in 1873 by the purchase of the Leland property, and a blast furnace in this city, the former being owned by an incorporate company, and the latter by the late Captain Ward. The bonds were payable as follows: \$60,000 in January, 1876; \$60,000 in January, 1878; \$70,000 in January, 1879. It will thus be seen that the entire indebtedness was \$250,000. Of this a small part was paid, but the unpaid interest now brings it up to nearly that amount again. The bill asks that the amount due on the bonds be computed, and the company ordered to pay it over on a certain date, in default of payment the property to be sold at auction, a deed given to the purchasers, and the purchase money turned over to the bondholders.

The mills will, without doubt, revert to the bondholders, who, being men of capital, will be able to run them advantageously. These proceedings will not conflict with any co-operative arrangement which may be made for running the mills pending the settlement of the business.—Wyandotte Courier.

ILLINOIS.

The Belleville Nail Works will stop at Christmas for three weeks to put in new nail machines.

KENTUCKY.

The Mt. Savage Furnace continues doing well on cold blast, making 8 tons per day.

The Hunnewell Furnace stopped on Friday the 7th inst., to clean her boilers, resuming to blow on Saturday the 8th inst. She is now making 18 tons of No. 1 iron.

The Princess Furnace is making about 16 tons foundry, and from all appearances will increase in quantity, as she is growing hotter and able to stand greater pressure and more burden.—Greenup Independent.

Special Notices.

TRUSTEE'S SALE.

The property formerly belonging to the Peekskill Iron Company, consisting of a Furnace in good repair, Mines, Railroad, Engine, Rolling Stock, etc., will be sold, at public auction without reserve, at the furnace mentioned, in Peekskill, N. Y., on Saturday, Dec. 21, 1877, at 10 o'clock noon. Terms of sale, 10 per cent. cash on day of sale; balance within 30 days and on delivery of deed. (Signed) LOUIS C. CLARK, Trustee.

A second postponement of the above-mentioned sale is hereby made until Thursday, Dec. 27, at 10 o'clock noon.

LOUIS C. CLARK, Trustee.

A GENTLEMAN WHO HAS HAD SEVERAL years' experience as manager of and buyer for a company store, is open for an engagement with a first-class company. References exchanged. Address: STORE, Office of The Iron Age, 83 Reade St., New York.

SITUATION WANTED.—By a man of 20 years' experience in the hardware trade, to travel for some good Hardware or Cutlery House or manufacturer of Hardware or Cutlery. Unexceptionable reference given. Address: DELTA, Office of The Iron Age, 83 Reade St., New York.

For Sale.

The **HARDWARE BUSINESS** of Sampson & McLean, 33 Federal St., Allegheny City, Pa.

This is known to be the best stand in the city. Stock including about \$5000; in good condition and suitable to the wants of an established trade. Inquire of

JOHN BINDLEY, Assignee,
48 7th Ave., Pittsburgh, Pa.

Wanted.

A first-class finisher on 18 inch merchant bar mill. To a competent and sober workman steady employment and good wages will be given. No others need apply. The mill is near Philadelphia. Address: FINISHER, Office of The Iron Age, 220 S. 4th St., Philadelphia.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address: IRON AND STEEL, Care of P. O. Box 313, Bridgeport, Conn.

A SITUATION WANTED

by a man who understands rolling Merchant, Hoop and Guide Iron; can turn Rolls, put up and repair Machinery; can manufacture old steel into Tire or Toe-calk Steel for about the same price of iron; can make Horse Shoe Iron equal to the best in the market. Address: LOCK BOX 393, Boonton P. O., Morris Co., N. J.

For Sale.

or for Rent on favorable terms, **Philadelphia Hydraulic Works.** For further information apply at the works, corner of Evidina and Levant Sts., Philadelphia, Pa.

Special Notices.

TO LET

For a Term of Years,

At a Moderate Rent,

THE MACHINE SHOP

OF THE

Burdon Iron Works,

BROOKLYN, N. Y.

Established in 1836 and now doing a Good Business.

The premises have been remodeled and refitted with machinery especially adapted to the building of Steam Engines, Pumps and Hydraulic Elevators. The Pumps and Hydraulic Elevators are patented machines, and the preference in building will be given to the lessee. Twelve elevators were made in 1875, thirty in 1876, and sixty in 1877, with a prospect of 150 being wanted in 1878. Other specialties equally promising. A rare opportunity to secure a permanent business with a moderate capital. Mr. Misland, the present partner, who has been foreman in the establishment for 25 years, would take an interest in the business, or would remain as foreman and attend to the elevator department. The first floor of the main building, 16,000 square feet, with all its machinery, tools and fixtures, will be rented for \$2500 per year, and business to the amount of \$100,000 per year may be done by the lessee, provided they have the capital and ability to do the work.

Apply to **WILLIAM BURDON,**
Corner Front and Pearl Streets,
Brooklyn, N. Y.

DECEMBER LIST.

MACHINE TOOLS, Second-Hand.

Three No. 1 Pratt & Whitney Screw Machines, with wire feed.
One No. 1 Pratt & Whitney Screw Machine, with wire feed.
Two "Belden" Screw Machines.
Two Engine Lathes, 13 in. swing, 5 ft. bed.
Two Engine Lathes, 22 in. swing, 8 ft. bed.
One Engine Lathe, 76 in. swing, 36 ft. bed.
One Pratt & Whitney Lathe, 13 in. swing, 5 ft. bed, with taper attachment. One Engine Lathe, 15 in. swing, 6 ft. bed. One Engine Lathe, 18 in. swing, 8 ft. bed. One Engine Lathe, 22 in. swing, 10 ft. bed. Three Engine Lathes, 22 in. swing, 8 ft. bed. Six Turning Lathes, 14 in. swing, 4 1/2 ft. bed. Three 4-spindle Drills. One Brown & Sharpe Universal Milling Machine. One 36x36x7 Planer. One 8 in. Shaper. One Gear Cutter. One "Bement" No. 2 Cutter and Key Seat Drill. One new "Hardaway" Bolt Heading Machine, to head up to 3/4 in. bolts. One new "Hardaway" Bolt Heading Machine to head up to 1 1/4 in. bolts. One "Ferris & Miles" 500 lb. Steam Hammer. Please specify which of the above tools you want and we will forward all particulars. The above tools will be sold very low, and can be seen at

The George Place Machinery Agency,

121 Chambers and 103 Reade Sts., N. Y.

A GENTLEMAN WELL POSTED IN THE Hardware Business, anticipating a trip to South America, will arrange with manufacturers at home to represent their goods in that country. The object will be to establish connections there, and as many of the manufacturers are turning their attention to our productions in preference to those of other foreign countries, the opportunity for introducing American Hardware, &c., will be a good one. For particulars address

"BRAZIL,"
Office of The Iron Age, 83 Reade St., N. Y.

Steel, Boiler Tubes, Railroad Supplies and Specialties in Machinery.

A gentleman with a practical knowledge of, and thoroughly posted in, the above trades, desires to travel in the interests of several firms not conflicting with each other. Is an experienced traveler and has an extensive acquaintance with railroad companies and manufacturers in all parts of the country. Address, until Jan. 1st,

Commercial Traveler,
Box 1218, N. Y. P. O.

For Sale.

Half interest in two valuable patents and business now paying over \$400 per month. Little money required, balance on easy payments. Address: I. G. M., 288 Cambridge St., Philadelphia, Pa.

PARTIES OWNING A LARGE BRICK BUILDING, with engine, boiler, and shafting, in good order, would be pleased to negotiate with experienced parties with the view of establishing Malleable and Gray Iron Works, Shovel Works, or some kindred branch of business. Said factory is favorably located at a railroad center in a flourishing village near New York City. Low rates of freight and cheap fuel. Facilities for selling goods first class. Address

"INDUSTRY,"
Box 1146, New York P. O.

OLD COLONY RIVET COMPANY

Have removed to their old stand,

116 Chambers St., New York,

where they will carry a full line of Rivets, Iron Cutters, Iron Planers, Punches, &c., &c.

DUNBAR, HOBART & WHIDDEN,

New York Agents.

TO BLAST FURNACE OWNERS.

Parties owning furnaces out of blast, and in localities where the manufacture of Pig Iron cannot be made to pay, and who desire to sell the same for removal, are invited to correspond with the undersigned, giving full particulars.

Address

Office of The Iron Age, 83 Reade St., N. Y.

Wanted.

100 to 500 Tons Steel Rods or Wire suitable for making screws.

Address

Office of The Iron Age, 83 Reade St., New York.

Special Notices.

A B

Tin and Terne Plates.

JOSHUA WILLIAMS & CO., LIMITED,

of Dulais, near Neath, Glamorganshire, have recently discovered that large quantities of Tin Plates branded with their old and well-known brand

A B

have been sent from Liverpool to the United States of America, which are not their manufacture, and therefore calculated to damage the reputation of this old and well known brand, the boxes being fraudulently marked A & B, thus:

A B

Buyers are cautioned against this spurious imitation.

JOS. WILLIAMS & CO., LIMITED,

For ARTHUR GILBERTSON.

Paris Exposition of 1878.

C. W. MAY, FIRNBERGER & CO.,
Commission Merchants,
50 Boulevard Hausmann, Paris,
Agents for American Exhibitors.

For information and blanks apply to
A. W. MORTON, 22 Platt St., New York.
Application for space may now be made.

"L'Exposition de 1878."

PARIS & WASHBURN,
American Manufacturers' Agents in
France, Exporters, Importers and
Commission Merchants.
Also Representatives at the
Paris Exposition of 1878 of American
Exhibitors.

at the lowest terms, having the best facilities, as we are interested in the sale and introduction of American goods into France, FREE OF CHARGE, and are the OFFICIAL AGENTS of L'Exposition de 1878 Journal at New York. Particulars on application. Samples and catalogue received and forwarded to our Paris house.

PARIS & WASHBURN,
68 Rue de Rivoli, opposite the Hotel de Ville (City Hall), Paris.
No. 23 Cliff St. (over Phelps, Dodge & Co.), New York.

PARIS EXPOSITION.

An American who has long resided in Paris, and contemplates returning soon, would make arrangements with one or two good concerns to represent their interests at the coming French Exhibition, either on salary or commission. Exhibitors desiring the services of a reliable, competent man, please address

Office of The Iron Age, 83 Reade St., N. Y.

PAUL HYAN, 16 Magazine Strasse, Berlin, Prussia,

is desirous of assuming a few more agencies for Germany of American manufacturers of repute. He is general agent of Messrs. Gardner & Co., New York, and several iron works, and begs to state that he is a man of standing, responsibility and long experience in architectural and manufacturing matters. During 20 years he has been proprietor of one of the most prominent manufacturing of architectural goods, and is now owner of a commodious store, centrally located at Berlin, where he can exhibit goods and samples to advantage. Arrangements will, if desired, be made by him to have his constituents properly represented at the Paris Exposition of 1878. References: Messrs. Gardner & Co.; Messrs. Steinway & Sons, New York.

CHARLES OTTO,

P. O. Box 1192,

(ESTABLISHED 1854.)

Importer & Dealer in HARDWARE,

Manufacturers' Agent, etc.

12 & 14 Front and
250 & 252 Market St., San Francisco.

I am prepared to make arrangements with Eastern manufacturers to act as their agent for the sale of Hardware, etc., on the Pacific Coast.

REFERENCES:

Sargent & Co., 37 Chambers Street, New York.

Van Wagoner & Williams, 83 Beekman St., N. Y.

T. Hessebruch & Co., 10 N. 5th St., Philadelphia.

The Pennsylvania Tack Works, Norristown, Pa.

The Pacific Bank, San Francisco.

FOR SALE.

The valuable property known as

The Salisbury Iron Mfg. Co. of

Virginia,

Situated in the

COUNTY OF BOTETOURT,

fourteen miles south of the town of Fincastle,

on the Catawba Creek, one-quarter of a mile from the James River and twelve miles from Clifton Forge, on the

Chesapeake and Ohio Railroad.

The railroad from the town of Buchanan to Clifton Forge runs through this property.

The company owns 288 acres of land, on which is erected a Furnace, in blast, making car wheel charcoal iron. The ore is of a superior quality and inexhaustible.

There are several houses on the estate. A grist mill and store, about 25 horses, wagons, harness, tools, &c., &c.

The Furnace, with the exception of the last two years, has been in blast six years.

The Property is owned by the undersigned, and the Estate of the late Jacob Dakin.

Mr. Dakin died last Spring. During his life he was the sole active manager. His death renders it necessary that the Estate should be sold.

It will be sold at a price corresponding with the present state of the Iron Trade, and on easy terms as to payment. Apply to

EUGENE KELLY,

45 Exchange Place, New York.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address

CAR WHEEL FOUNDRY,

P. O. Box 134, Selma, Alabama.

Special Notices.

DROP FORGINGS.

The TRENTON VIEW & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

Important to Manufacturers.

BISSELL, WELLES & MILLET,
Auctioneers and Commission Merchants, No. 15 Murray St., New York.

Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lots of goods are unsurpassed. Advances made if desired.

Lamberson's HARDWARE PRICE BOOK.

Half leather, \$30; full leather, \$32; full Russia, \$34. Send for descriptive circular.

DISCOUNT LIST.

Screws..... 75c. Cast Butts..... 75c.

Bolts..... 75c. Wrot. Butts & Hinges, 75c.

BUELL LAMBERSON, 97 Chambers St., N. Y.

NOTICE.

PHILADELPHIA, April 2, 1877.

On and after April 20th the Shipping Agency of

The Pennsylvania Warehousing and

Sale Deposit Co., at Perth Amboy, New Jersey, will be discontinued.

SPECIAL NOTICE.

The undersigned offer their services as agents to

American Producers of Metals.

They represent foreign brands of

Zinc, Russia Iron, Hoop Iron, Window

Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKE,

20 Reade Street, N. Y.

Attention.

Dealers in Hardware, Iron and Steel, Coach Makers' and Blacksmiths' Supplies and general Machinery will find it greatly to their interests to write for descriptive circular and discounts of the Improved

"Eclipse" Fan Blower, for home and export trade.

Is cheaper, better and more durable than the belows; requires only 12x30 inches floor space. See cut and description in The Iron Age of May 17, 1877.

Address

EZRA F. LANDIS,
Lancaster, Pa.

For Sale.

100 tons best blacksmith or forging coal. Delivered

in two weeks in New York, below 13th street, or in

Jersey City or Hoboken. Address

COAL,

Office of The Iron Age, 83 Reade St., N. Y.

A SPLENDID CHANCE.

An old established stand, stock and good will of a firm in central Illinois which is doing a prosperous business. A rare chance for one who wishes to engage in trade. Reasons of sale made known on application. Address

C.,

Office of The Iron Age, 83 Reade St., N. Y.

RAIL and BAR MILLS

FOR LEASE.

The Baltimore and Ohio Railroad Company offers to lease its first-class Rail and Bar Mills, located at

Cumberland, Md.

The mills are complete in all their appointments, and in first-class order. There are 15 Puddling furnaces in the Puddle Mill; 6 Heating Furnaces in the "Top and Bottom" Mill; and 10 Heating Furnaces in the Rail Mill. The capacity of the mill is from 50 to 100 tons of finished rails per day, single turn.

The Bar Mill has one puddling furnace, two scrap-heating furnaces and seven heating furnaces, and its capacity is from 45 to 50 tons of finished bars per day.

The location of this property renders it one of the most desirable of its class in the country. Coal of superior quality can be procured from the adjoining mines at a low cost, and pig metal from the neighboring furnaces in Pennsylvania, Maryland and Virginia.

The Mills are admirably situated for economy of manufacture and shipments, as low rates of freight will be given over the company's lines, which extend to all important points in the East, South, Southwest, West and Northwest.

To a responsible party the mills will be leased for a term of years on reasonable terms.

Apply to

WM. KEYSER, 2d Vice-Prest,
Candem Station, Baltimore.

Or to **JOHN C. DAVIS,**

Master of Machinery, Mount Clay, Baltimore.

For Sale.

Part interest in a Patent Staple Article. An active business man can make from \$10.00 to \$12.00 a year on small capital. Business exclusively with Hardware Jobbers and perfectly reliable and honorable. Wants to sell the right for the Eastern States, or would sell one-half of the Patent and operate jointly.

Address

G. T. J.,

Office of The Iron Age, 83 Reade St., N. Y.

For Sale.

The stock and good will of an old-established Hardware house, with a good trade, in a town of about 2000 inhabitants, near Toledo, O. The stock is well assorted and will involve about \$7000. Best of reasons given for wishing to sell. Address

BOSTWICK, BROWN & CO.,

Trade Report.

OFFICE OF THE IRON AGE,
WEDNESDAY EVENING, Dec. 19, 1877.

The past week has been without events of special interest in the financial markets. Notwithstanding the general depression, all classes of business men take a hopeful view of the future, and it is believed that with the new year we shall enter upon a steady progress toward recovery. The general opinion is that all the existing conditions are favorable to recovery, and that if Congress does nothing to spoil the outlook, general trade will be better next year than at any time since the panic. It is not believed now that the advocates of the silver bill have any chance of making that measure a law; but that there is a lingering uneasiness is shown by the fact that when the adjournment of Congress for a month was announced, gold declined from 103 3/4 to 102 1/2, and government bonds advanced here and in London. The money market has grown somewhat firmer during the week, and closes at 6 @ 7 on call. The discount rate on prime business paper is 5 @ 7 1/2.

The following table shows the daily range of the gold market, which declined for the reason stated above:

	Highest.	Lowest.
Thursday	103 3/4	103 1/4
Friday	103 1/4	102 3/4
Saturday	102 3/4	102 1/4
Monday	102 1/4	102 1/4
Tuesday	102 1/4	102 1/4
Wednesday	102 1/4	102 1/4

There is nothing of importance to note in the bond market. Governments are strong. State bonds mostly firm and railway mortgages dull and strong.

The stock market has been quite irregular. Up to Monday prices advanced, led by Lake Shore and what are known as the coal stocks. On Monday, however, there was a reaction, and prices declined sharply 1/2 @ 3/4. The principal transactions have been in Western Union, Delaware, Lackawanna and Western, Lake Shore, Northwestern, St. Paul and Michigan Central. We give below the closing quotations of active shares.

The last bank statement makes the following comparison of aggregate averages:

	Dec. 8	Dec. 15	Differences.
Loans	\$23,578,200	\$23,504,000	Dec. 1, 1877, 200
Specie	18,995,000	19,566,800	571,800
Legal tenders	34,478,700	37,562,900	3,084,200
Deposits	196,012,300	195,896,400	115,900
Circulation	18,203,300	18,676,700	473,400

The foreign trade movements for the week are shown in the following tables:

For week ended Dec. 15:

	1875.	1876.	1877.
Total for week	\$5,279,516	\$4,044,054	\$3,909,695
Prev. reported	311,345,955	265,673,486	324,797,566

Since Jan. 1... \$316,625,171 \$269,717,540 \$306,767,261

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Anvils	170	\$1,450
Brass goods	9	1,509
Bronze	6	1,509
Cutlery	38	18,834
Guano	12	2,084
Iron, pig, tons	250	3,530
Iron, other, tons	606	33,507
Lead, pigs	1,500	10,112
Metal goods	65	7,309
Nails	2	52
Needles	5	79
Nickel	1	1,073
Old metal	1	3,273
Platina	1	2,768
Per. caps	15	2,768
Saddlery	137	9,427
Steel	3	154
Silverware	3	103,768
Tin, boxes	23	131,217
Tin, 9, 193 shabs	796	227
Wire	2	227

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended Dec. 18:

	1875.	1876.	1877.
For the week	\$6,286,600	\$5,724,257	\$6,310,059
Prev. reported	245,481,262	261,253,664	284,188,251

Since Jan. 1... \$251,767,862 \$266,977,921 \$299,507,310

EXPORTS OF SPECIE.

	1875.	1876.	1877.
Total for the week	\$163,000	\$163,000	\$163,000
Previously reported	24,621,260	24,621,260	24,621,260

Total since Jan. 1, 1877... \$24,784,266

Same time in 1876... 48,331,070

Same time in 1875... 70,185,752

Same time in 1874... 57,433,740

Same time in 1873... 47,749,043

Same time in 1872... 60,676,657

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6's	123 1/2	123 3/4
U. S. 6's 1881 reg.	103 1/2	103 3/4
U. S. 6's 1881 coupon	103 1/2	103 3/4
U. S. 6's 1885 new reg.	103 1/2	103 3/4
U. S. 6's 1885 coupon	103 1/2	103 3/4
U. S. 6's 1889 reg.	103 1/2	103 3/4
U. S. 6's 1889 coupon	103 1/2	103 3/4
U. S. 6's 1893 reg.	103 1/2	103 3/4
U. S. 6's 1893 coupon	103 1/2	103 3/4
U. S. 5's 1881 reg.	103 1/2	103 3/4
U. S. 5's 1881 coupon	103 1/2	103 3/4
U. S. 4 1/2's 1881 reg.	103 1/2	103 3/4
U. S. 4 1/2's 1881 coupon	103 1/2	103 3/4
U. S. 4's 1897 reg.	103 1/2	103 3/4
U. S. 4's 1897 coupon	103 1/2	103 3/4

The following are the closing quotations of active shares:

	Bid.	Asked.
Atlantic and Pacific Telegraph	20 1/2	21
Chicago and Northwest	34	34 1/2
Chicago, Rock Island and Pacific	99 1/2	99 3/4
Chicago, Bur. and Quincy	101 1/2	101 3/4
Col. and Indiana Central	3	3 1/2
Clev. Col. and Ind.	34 1/2	34 3/4
Cleveland and Pittsburgh	77 1/2	77 3/4
Chicago and Alton	100	100 1/2
Consolidation Coal	25 1/2	25 3/4
Canton	18	18 1/2
Delaware, Lack. and Western	50 1/2	50 3/4
Delaware and Hudson Canal	51 1/2	51 3/4
Espresso-Adams	97 1/2	97 3/4
United States	47	47 1/2
Wells, Fargo & Co.	86 1/2	86 3/4
Harlem	9	9 1/2
Hannibal and St. Joseph	11 1/2	11 3/4
Illinois Central	25 1/2	25 3/4
Kansas Pacific	72 1/2	72 3/4
Lake Shore	73 1/2	73 3/4
Michigan Central	56 1/2	56 3/4
Morris and Essex	75 1/2	75 3/4

Milwaukee and St. Paul	35 1/4	35 3/4
Mariposa	3	3 1/2
New York Central	103 1/2	103 3/4
New Jersey Central	13 1/2	13 3/4
New Jersey Southern	9 1/2	9 3/4
Ohio and Mississippi	10 1/2	10 3/4
Pacific Mail	21	21 1/2
Panama	12 1/2	12 3/4
Pittsburgh and Fort Wayne	92 1/2	92 3/4
Quicksilver	10	10 1/2
St. Louis and Iron Mountain	28 1/2	28 3/4
St. Louis Kansas City Northern	4 1/2	4 3/4
Toledo, Wabash and Western	14 1/2	14 3/4
Union Pacific	66 1/2	66 3/4
Western Union Telegraph	77 1/2	77 3/4

MINING STOCKS.

Mr. Ogden Haight, No. 25 Pine street, sends us the following report of the business of the New York Mining Stock Exchange for the week ending Dec. 19:

	Closing Quotations, in Currency.	Shares Sold.
New York and Colorado	2 1/2	3,000
Moore	7 1/2	15,800
Lacrosse	34	12,700
Bertha & Edith	23	8,200
American Flag	7.00	7,500
King's Mountain	11	9,000
Seaton Consolidated	2 3/4	11,300
Consolidated Virginia	1 1/2	100
Julia	3 1/2	20

American Consolidated opened at \$5.25 and advanced to \$7. American Flag sold at 9 1/2 and 10 1/2 early in the week, but was strong at 11 1/2 at the close. Bertha and Edith has been steady at 30 1/2 but fell to 30 yesterday. No sales of Bobtail. None of Hukill. Lacrosse opened at 30 1/2, rose to 36 1/2 at 37 1/2 and declined again to 34 1/2 with considerable interest. Moore opened at \$7.12 1/2 ex. div., rose to \$7.37 1/2, fell to \$6.87 1/2 and rose to \$7.12 1/2 again finally. New York and Colorado opened at \$2.12 1/2 and closed at \$2.25. The stock of a new company, called the Kings Mountain Mining Company, of which one of the celebrated "bonanza firm of Mackey, Fair & O'Brien" is a director. It was put on at \$2 and rose to \$2.25, reaching at the close \$2.37 1/2.

GENERAL HARDWARE.

Considering that the Christmas festivities are almost upon us, and the season has arrived when business men expect a little leisure to put their books in order for the coming year, and count the profits of the closing year, there seems little cause for grumbling at the volume of business doing now, which, although small in comparison with the activity that characterized our market for the past four or five months, is nevertheless fully up to the average demands of this season. There is considerable activity among manufacturers in the matter of preparation for next spring's trade. The manufacturers of Copper issued, on the 13th instant, a revised price list, showing a reduction of 2 1/2 @ 3 on Sheathing and Braziers' Copper, Bolts, &c. The revised price list will be found under the head of New York Wholesale Prices, on page 31. The price of O'Neil's Planished Copper is also reduced 2 1/2 @ 3. No change has been made in the price of Copper Rivets and Burrs, Copper Bottoms or Wire.

The manufacturers of Deep and Common Stamped and Retained Ware held a meeting in this city to-day, which was well attended. No change was made in existing lists, discounts or terms, and as the next regular meeting of this association does not take place until June, 1878, it may be inferred that the present prices will be the rule at least until that time.

The Table Cutlery Manufacturers' Association concluded their annual meeting in this city to-day, the principal feature of which was the election of the following officers for the ensuing year: President, H. T. Reeves; Executive Committee, R. N. Oakman, Jr., C. S. Landers, B. B. Yale and H. A. Curtiss; Secretary and Treasurer, R. H. Johnson.

Prices and terms remain substantially the same as last season. The meeting was well attended and harmonious. A communication was received from the Western Hardware Association congratulating the manufacturers on the success of their organization.

The manufacturers of Strap and T Hinges held a meeting in Cincinnati to-day, but up to the close of business their action, if any, had not transpired.

The condition of the Nail trade is much the same as at our last writing, the demand is light, which is quite natural at this season. Owing to the action taken by the Western Nail Association regarding curtailment of production, mention of which appeared in our columns last week, a meeting of the Atlantic States Nail Association will be held in this city to-morrow (Thursday). The object of this meeting, we are informed, is solely for the purpose of co-operating with the Western makers in their efforts to limit production, which is at present, and has been for a long time, so much in excess of the requirements of the country as to have the effect of keeping prices in a state of constant demoralization. It is hoped that all the mills east of the Alleghenies will be represented at the meeting. There is nothing new to report in the matter of prices, and we continue to quote 104, \$2.40, net, in a small way; for fair sized orders this figure is easily shaded.

U. Bohren & Co., No. 256 West Twenty-eighth street, have placed on the market Bohren's Patent Rosewood Faucets, which have been greatly improved since they were first offered to the trade. This Faucet is made of rosewood and pure tin, and they claim that it is superior to any wooden Faucet in the market. In a circular explaining the operation of this Faucet the manufacturers say: "The stoppage is effected by a rubber ball, which by means of the handle is drawn toward the smaller por-

tion of the channel, thus securing perfect tightness. It cannot get out of order by being driven into the cask, the strain not affecting the valve. It is very durable, there being no friction on any part of the faucet. It may be kept any length of time without being used, as it is not affected by shrinkage. It is the only Faucet which will stand the strongest vinegar, and proves equally satisfactory with all other liquids."

We print below the price list for these goods, which is subject to discount 25% to the regular trade, with an extra discount for quantity orders.

Bohren's patent Rosewood Faucets for Vinegar, Wine, Cider, Liquors, &c., &c.

No. 6, 6 inch long, per doz. \$4.50

No. 7, 7 " " " 4.75

No. 8, 8 " " " 5.00

For Ale (performed at the end.)

No. 10, 10 inch long, per doz. 7.00

Lager Beer Extensions (maple).

12 inch, per doz. 1.90

15 " " " 2.10

Peter Roy, who is well known to the Hardware trade of the country, in his late capacity of superintendent and manager of the Roy Butt and Hinge business, at Troy, N. Y., has opened an office at No. 82 Chambers street, where he will represent several important lines of goods. He has issued the following card:

NEW YORK, Dec. 18, 1877.

GENTLEMEN: I represent direct the following manufacturers:

E. W. Gilmore & Co. Strap and T-Hinges.

McKinney Mfg. Co., Wrought Butts.

Troy Stamping Works, Stamped Ware, &c.

Mohawk and Hudson Mfg. Co., Valves, Fire Hydrants, Machinery, etc.

Please write for prices when in want. After January 1st I shall represent several other lines of goods.

Yours truly,

PETER ROY, 82 Chambers street.

The Peck, Stow & Wilcox Co., Southington, Conn., and No. 43 Chambers street, New York, have ready for distribution their 1878 illustrated catalogue and price list. The book, which is handsomely printed on tinted paper, contains 296 pages; it is comprehensively indexed; over 70 pages are devoted to illustrations, descriptions and price lists of the large assortment of Tinsmiths' Tools and Machines manufactured by them; these are followed by Tinsmiths' Hardware and House Furnishing goods, which cover about 50 pages of the book. In this department they show a good assortment of Coffee and Spice Mills, Frying Pans, Tinners' Trimmings, Bronzed Match Safes, Stove Cover Lifters, Blower Stands, Fire Set Standards and kindred goods, Vises, Mincing Knives, Stove Bolts, Rivets, &c. The third department of the book contains 125 pages, showing a large assortment of General Hardware goods, among which we notice a very handsome line of Door Trimmings, Cupboard Catches, Sash Fasteners and Lifts in "Adamantine" (better known as imitation) Bronze; in the same finish they show a good assortment of Ceiling, Bird Cage and Chandelier Hooks, Hat and Coat Hooks, Chest Handles, Barrel Bolts, &c. The remainder of the book is occupied with illustrations and lists of a large variety of Carriage and Saddlery Hardware, in which is included a good line of Curry Combs. The catalogue is very comprehensively illustrated and the large variety of goods shown are all of their own manufacture.

We have received the following:

NEW BRITAIN, Conn., Dec. 18, 1877.

To Hardware Merchants—GENTLEMEN:

Please accept our thanks for your appreciation, as manifested in your favors, of the revolution we have inaugurated in the styles of Spring Hinges, as well as the excellence of our goods. Some rival makers have copied the idea of a Reversible Spring Hinge and imitated our ornamental tip. In ordering, therefore, call for the "Centennial Spring Hinge," and you will get ours. You need not say if right or left is wanted. The manufacture of these goods is in the hands of skilled artisans and inventors, while Progress is our motto. Very sincerely yours,

UNION MFG. CO.

J. WARREN TUCK, Treasurer.

We do not usually, except in the case of such volumes as Hardware manufacturers issue from time to time, publish book notices under the heading of General Hardware, but as there is no book in the hands of the wholesale trade of greater importance than a book of reports giving reliable information regarding the business status of every dealer in the United States and Canada who is likely to buy on credit; we offer no apology for our notice in this place of the J. M. Bradstreet & Son Co.'s Improved Mercantile Agency, and the volumes of reports which they offer to the mercantile community. This company will issue, on the 7th of January next, the 42d semi-annual volume of their book of reports, of which they say: "We intend that it shall be more complete in its classification, more comprehensive in its scope, closer and more conservative in its estimates of responsibility and credit than any previously issued." In addition to the four large volumes of reports which they publish during the year, they issue to their subscribers semi-weekly sheets, noting all the changes in styles of firms, ratings, &c., as they occur. Subscribers can also be supplied at a small additional cost with pocket editions of single States for the use of commercial travelers. There are other valuable privileges which subscribers to this agency enjoy which are fully explained in their advertisement on the 18th page, and to which we invite the attention of our readers. This company have branch offices in the principal cities of the United States and Canada, and in London, England; their offices in

this city are at 279, 281 and 283 Broadway. The Jacobus & Nimick Mfg. Co., Pittsburgh, Pa., will issue, under date of 15th instant, the following revised price list of Locks, Latches, Scales, Coffee Mills, &c., manufactured by them. Their terms and discounts are as follows:

Terms and Discounts.

Locks, Latches, Knobs, Escutcheons and Keys.

Genuine Bronze Locks, Latches, Butts and Builders' Hardware.

Scales, Coffee Mills, &c.

All other goods.

A cash discount of 2% will be allowed if paid within 10 days from date of shipment.

Goods transit at risk of purchaser.

A moderate charge will be made for cases.

Graham & Haines, Nos. 113 Chambers and 95 Reade streets, are their agents in this city.

JACOBUS & NIMICK MANUFACTURING CO.'S

REVISED PRICE LIST.

Mortise and Rim Locks and Latches.

Upright Rim Locks.

No. Page Size Price of Lock, per doz. of Lock, per doz.

11 " 1 1/4 4 1/2 \$4.25 4 1/2 1/2 6 \$4.00

12 " 1 1/2 4 1/2 4 1/2 1/2 6 37.00

13 " 1 3/4 4 1/2 4 1/2 1/2 6 45.00

14 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

15 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

16 " 1 1/2 4 1/2 4 1/2 1/2 6 40.00

17 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

18 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

19 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

20 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

21 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

22 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

23 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

24 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

25 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

26 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

27 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

28 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

29 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

30 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

31 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

32 " 1 1/2 4 1/2 4 1/2 1/2 6 30.00

33 " 1 3/4 4 1/2 4 1/2 1/2 6 30.00

34 " 1 1/2 4 1/2 4 1/2 1/2 6

Genuine Bronze Metal Shutter Knobs.—Page of Catalogue, 278.

No. 1, 1 in. \$2.75

No. 2, 1 1/2 in. 4.25

Genuine Bronze Metal Shutter Bars.—Page of Catalogue, 278.

No. 1, 2 in. \$4.25

No. 2, 2 1/2 in. 4.75

Genuine Bronze Metal Sash Lifts.—Page of Catalogue, 279.

No. 4, 3 1/2 in. Ornament 1 G-n. Brn'ze Met'l. \$6.25

No. 5, Small. 4.80

No. 6, Medium. 4.80

Plating Fronts, Strikes and Keys to Locks.

Elec. Pl'd. H'd. Pl'd.

Per doz. \$16.00

Locks, Plain Front and Strike, 5 in. \$24.00

Locks, Plain Front and Strike, 6 1/2 in. 34.00

Locks, Rabbeted Front and Strike, 5 1/2 in. 48.75

Locks, Plain Front and Strike, 4 1/2 in. 22.00

Locks, Rabbeted Front and Strike, 5 in. 31.00

Locks, Astragal Front and Strike, 5 in. 31.00

Brass Plating.—Add to Price of Lock.

Mortise Knob Latches, 3 1/2 in. Plated Bolt. \$4.00

Bolt. 1.60

Mortise Knob Latches, 3 1/2 and 4 in. Plated Bolt. 1.25

3 1/2 and 4 in. Plated Bolt. 1.25

Strikes and Locks.60

Rim Knob Latches, 3 1/2 in. Plated Bolt.95

4 in.95

Locks, Upright, 4 1/2 in. Plated Bolt. 1.25

Horizontal, 4 1/2 in. 1.25

Keys.—Brass, Nickel-Plated, Steel and Steel Bit Keys.—Page of Catalogue, 222 to 227.

Class No. 2 3 4 5 6

Per doz. \$2.50 2.50 2.50 3.00 5.00 6.00

Class No. 7 8 9 10 11 12 13

Per doz. \$7.50 3.50 4.50 7.00 6.00 3.00 2.00

Class No. 14 15 16 17 18 19 20

Per doz. \$4.00 3.50 3.50 3.50 3.50 4.50 4.50

Class No. 21 22 23 24 25 26 27

Per doz. \$3.50 2.00 2.00 2.50 4.50 4.50 10.00

Tinned Malleable Iron Keys.—Page of Catalogue, 228 and 229.

Class No. 28 29 30 31 32

Per doz. \$0.75 .75 .75 .75 .75

Novelty Door Keys.—Page of Catalogue, 229.

Class No. 33 34 35 36 37

Per doz. \$0.75 1.00 2.00 3.50 6.50

Eucatechons.—Page of Catalogue, 218 to 221.

Japanned Plate Eucatechons.

Class No. 0 1/2 1 1 1/2 1 3/4 2 1/2 3 1/2 4 1/2 5 1/2 6 1/2 7 1/2 8 1/2 9 1/2 10 1/2 11 1/2 12 1/2 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2 19 1/2 20 1/2 21 1/2 22 1/2 23 1/2 24 1/2 25 1/2 26 1/2 27 1/2 28 1/2 29 1/2 30 1/2 31 1/2 32 1/2 33 1/2 34 1/2 35 1/2 36 1/2 37 1/2 38 1/2 39 1/2 40 1/2 41 1/2 42 1/2 43 1/2 44 1/2 45 1/2 46 1/2 47 1/2 48 1/2 49 1/2 50 1/2 51 1/2 52 1/2 53 1/2 54 1/2 55 1/2 56 1/2 57 1/2 58 1/2 59 1/2 60 1/2 61 1/2 62 1/2 63 1/2 64 1/2 65 1/2 66 1/2 67 1/2 68 1/2 69 1/2 70 1/2 71 1/2 72 1/2 73 1/2 74 1/2 75 1/2 76 1/2 77 1/2 78 1/2 79 1/2 80 1/2 81 1/2 82 1/2 83 1/2 84 1/2 85 1/2 86 1/2 87 1/2 88 1/2 89 1/2 90 1/2 91 1/2 92 1/2 93 1/2 94 1/2 95 1/2 96 1/2 97 1/2 98 1/2 99 1/2 100 1/2 101 1/2 102 1/2 103 1/2 104 1/2 105 1/2 106 1/2 107 1/2 108 1/2 109 1/2 110 1/2 111 1/2 112 1/2 113 1/2 114 1/2 115 1/2 116 1/2 117 1/2 118 1/2 119 1/2 120 1/2 121 1/2 122 1/2 123 1/2 124 1/2 125 1/2 126 1/2 127 1/2 128 1/2 129 1/2 130 1/2 131 1/2 132 1/2 133 1/2 134 1/2 135 1/2 136 1/2 137 1/2 138 1/2 139 1/2 140 1/2 141 1/2 142 1/2 143 1/2 144 1/2 145 1/2 146 1/2 147 1/2 148 1/2 149 1/2 150 1/2 151 1/2 152 1/2 153 1/2 154 1/2 155 1/2 156 1/2 157 1/2 158 1/2 159 1/2 160 1/2 161 1/2 162 1/2 163 1/2 164 1/2 165 1/2 166 1/2 167 1/2 168 1/2 169 1/2 170 1/2 171 1/2 172 1/2 173 1/2 174 1/2 175 1/2 176 1/2 177 1/2 178 1/2 179 1/2 180 1/2 181 1/2 182 1/2 183 1/2 184 1/2 185 1/2 186 1/2 187 1/2 188 1/2 189 1/2 190 1/2 191 1/2 192 1/2 193 1/2 194 1/2 195 1/2 196 1/2 197 1/2 198 1/2 199 1/2 200 1/2 201 1/2 202 1/2 203 1/2 204 1/2 205 1/2 206 1/2 207 1/2 208 1/2 209 1/2 210 1/2 211 1/2 212 1/2 213 1/2 214 1/2 215 1/2 216 1/2 217 1/2 218 1/2 219 1/2 220 1/2 221 1/2 222 1/2 223 1/2 224 1/2 225 1/2 226 1/2 227 1/2 228 1/2 229 1/2 230 1/2 231 1/2 232 1/2 233 1/2 234 1/2 235 1/2 236 1/2 237 1/2 238 1/2 239 1/2 240 1/2 241 1/2 242 1/2 243 1/2 244 1/2 245 1/2 246 1/2 247 1/2 248 1/2 249 1/2 250 1/2 251 1/2 252 1/2 253 1/2 254 1/2 255 1/2 256 1/2 257 1/2 258 1/2 259 1/2 260 1/2 261 1/2 262 1/2 263 1/2 264 1/2 265 1/2 266 1/2 267 1/2 268 1/2 269 1/2 270 1/2 271 1/2 272 1/2 273 1/2 274 1/2 275 1/2 276 1/2 277 1/2 278 1/2 279 1/2 280 1/2 281 1/2 282 1/2 283 1/2 284 1/2 285 1/2 286 1/2 287 1/2 288 1/2 289 1/2 290 1/2 291 1/2 292 1/2 293 1/2 294 1/2 295 1/2 296 1/2 297 1/2 298 1/2 299 1/2 300 1/2 301 1/2 302 1/2 303 1/2 304 1/2 305 1/2 306 1/2 307 1/2 308 1/2 309 1/2 310 1/2 311 1/2 312 1/2 313 1/2 314 1/2 315 1/2 316 1/2 317 1/2 318 1/2 319 1/2 320 1/2 321 1/2 322 1/2 323 1/2 324 1/2 325 1/2 326 1/2 327 1/2 328 1/2 329 1/2 330 1/2 331 1/2 332 1/2 333 1/2 334 1/2 335 1/2 336 1/2 337 1/2 338 1/2 339 1/2 340 1/2 341 1/2 342 1/2 343 1/2 344 1/2 345 1/2 346 1/2 347 1/2 348 1/2 349 1/2 350 1/2 351 1/2 352 1/2 353 1/2 354 1/2 355 1/2 356 1/2 357 1/2 358 1/2 359 1/2 360 1/2 361 1/2 362 1/2 363 1/2 364 1/2 365 1/2 366 1/2 367 1/2 368 1/2 369 1/2 370 1/2 371 1/2 372 1/2 373 1/2 374 1/2 375 1/2 376 1/2 377 1/2 378 1/2 379 1/2 380 1/2 381 1/2 382 1/2 383 1/2 384 1/2 385 1/2 386 1/2 387 1/2 388 1/2 389 1/2 390 1/2 391 1/2 392 1/2 393 1/2 394 1/2 395 1/2 396 1/2 397 1/2 398 1/2 399 1/2 400 1/2 401 1/2 402 1/2 403 1/2 404 1/2 405 1/2 406 1/2 407 1/2 408 1/2 409 1/2 410 1/2 411 1/2 412 1/2 413 1/2 414 1/2 415 1/2 416 1/2 417 1/2 418 1/2 419 1/2 420 1/2 421 1/2 422 1/2 423 1/2 424 1/2 425 1/2 426 1/2 427 1/2 428 1/2 429 1/2 430 1/2 431 1/2 432 1/2 433 1/2 434 1/2 435 1/2 436 1/2 437 1/2 438 1/2 439 1/2 440 1/2 441 1/2 442 1/2 443 1/2 444 1/2 445 1/2 446 1/2 447 1/2 448 1/2 449 1/2 450 1/2 451 1/2 452 1/2 453 1/2 454 1/2 455 1/2 456 1/2 457 1/2 458 1/2 459 1/2 460 1/2 461 1/2 462 1/2 463 1/2 464 1/2 465 1/2 466 1/2 467 1/2 468 1/2 469 1/2 470 1/2 471 1/2 472 1/2 473 1/2 474 1/2 475 1/2 476 1/2 477 1/2 478 1/2 479 1/2 480 1/2 481 1/2 482 1/2 483 1/2 484 1/2 485 1/2 486 1/2 487 1/2 488 1/2 489 1/2 490 1/2 491 1/2 492 1/2 493 1/2 494 1/2 495 1/2 496 1/2 497 1/2 498 1/2 499 1/2 500 1/2 501 1/2 502 1/2 503 1/2 504 1/2 505 1/2 506 1/2 507 1/2 508 1/2 509 1/2 510 1/2 511 1/2 512 1/2 513 1/2 514 1/2 515 1/2 516 1/2 517 1/2 518 1/2 519 1/2 520 1/2 521 1/2 522 1/2 523 1/2 524 1/2 525 1/2 526 1/2 527 1/2 528 1/2 529 1/2 530 1/2 531 1/2 532 1/2 533 1/2 534 1/2 535 1/2 536 1/2 537 1/2 538 1/2 539 1/2 540 1/2 541 1/2 542 1/2 543 1/2 544 1/2 545 1/2 546 1/2 547 1/2 548 1/2 549 1/2 550 1/2 551 1/2 552 1/2 553 1/2 554 1/2 555 1/2 556 1/2 557 1/2 558 1/2 559 1/2 560 1/2 561 1/2 562 1/2 563 1/2 564 1/2 565 1/2 566 1/2 567 1/2 568 1/2 569 1/2 570 1/2 571 1/2 572 1/2 573 1/2 574 1/2 575 1/2 576 1/2 577 1/2 578 1/2 579 1/2 580 1/2 581 1/2 582 1/2 583 1/2 584 1/2 585 1/2 586 1/2 587 1/2 588 1/2 589 1/2 590 1/2 591 1/2 592 1/2 593 1/2 594 1/2 595 1/2 596 1/2 597 1/2 598 1/2 599 1/2 600 1/2 601 1/2 602 1/2 603 1/2 604 1/2 605 1/2 606 1/2 607 1/2 608 1/2 609 1/2 610 1/2 611 1/2 612 1/2 613 1/2 614 1/2 615 1/2 616 1/2 617 1/2 618 1/2 619 1/2 620 1/2 621 1/2 622 1/2 623 1/2 624 1/2 625 1/2 626 1/2 627 1/2 628 1/2 629 1/2 630 1/2 631 1/2 632 1/2 633 1/2 634 1/2 635 1/2 636 1/2 637 1/2 638 1/2 639 1/2 640 1/2 641 1/2 642 1/2 643 1/2 644 1/2 645 1/2 646 1/2 647 1/2 648 1/2 649 1/2 650 1/2 651 1/2 652 1/2 653 1/2 654 1/2 655 1/2 656 1/2 657 1/2 658 1/2 659 1/2 660 1/2 661 1/2 662 1/2 663 1/2 664 1/2 665 1/2 666 1/2 667 1/2 668 1/2 669 1/2 670 1/2 671 1/2 672 1/2 673 1/2 674 1/2 675 1/2 676 1/2 677 1/2 678 1/2 679 1/2 680 1/2 681 1/2 682 1/2 683 1/2 684 1/2 685 1/2 686 1/2 687 1/2 688 1/2 689 1/2 690 1/2 691 1/2 692 1/2 693 1/2 694 1/2 695 1/2 696 1/2 697 1/2 698 1/2 699 1/2 700 1/2 701 1/2 702 1/2 703 1/2 704 1/2 705 1/2 706 1/2 707 1/2 708 1/2 709 1/2 710 1/2 711 1/2 712 1/2 713 1/2 714 1/2 715 1/2 716 1/2 717 1/2 718 1/2 719 1/2 720 1/2 721 1/2 722 1/2 723 1/2 724 1/2 725 1/2 726 1/2 727 1/2 728 1/2 729 1/2 730 1/2 731 1/2 732 1/2 733 1/2 734 1/2 735 1/2 736 1/2 737 1/2 738 1/2 739 1/2 740 1/2 741 1/2 742 1/2 743 1/2 744 1/2 745 1/2 746 1/2 747 1/2 748 1/2 749 1/2 750 1/2 751 1/2 752 1/2 753 1/2 754 1/2 755 1/2 756 1/2 757 1/2 758 1/2 759 1/2 760 1/2 761 1/2 762 1/2 763 1/2 764 1/2 765 1/2 766 1/2 767 1/2 768 1/2 769 1/2 770 1/2 771 1/2 772 1/2 773 1/2 774 1/2 775 1/2 776 1/2 777 1/2 778 1/2 779 1/2 780 1/2 781 1/2 782 1/2 783 1/2 784 1/2 785 1/2 786 1/2 787 1/2 788 1/2 789 1/2 790 1/2 791 1/2 792 1/2 793 1/2 794 1/2 795 1/2 796 1/2 797 1/2 798 1/2 799 1/2 800 1/2 801 1/2 802 1/2 803 1/2 804 1/2 805 1/2 806 1/2 807 1/2 808 1/2 809 1/2 810 1/2 811 1/2 812 1/2 813 1/2 814 1/2 815 1/2 816 1/2 817 1/2 818 1/2 819 1/2 820 1/2 821 1/2 822 1/2 823 1/2 824 1/2 825 1/2 826 1/2 827 1/2 828 1/2 829 1/2 830 1/2 831 1/2 832 1/2 833 1/2 834 1/2 835 1/2 836 1/2 837 1/2 838 1/2 839 1/2 840 1/2 841 1/2 842 1/2 843 1/2 844 1/2 845 1/2 846 1/2 847 1/2 848 1/2 849 1/2 850 1/2 851 1/2 852 1/2 853 1/2 854 1/2 855 1/2 856 1/2 857 1/2 858 1/2 859 1/2 860 1/2 861 1/2 862 1/2 863 1/2 864 1/2 865 1/2 866 1/2 867 1/2 868 1/2 869 1/2 870 1/2 871 1/2 872 1/2 873 1/2 874 1/2 875 1/2 876 1/2 877 1/2 878 1/2 879 1/2 880 1/2 881 1/2 882 1/2 883 1/2 884 1/2 885 1/2 886 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employed, and have no room for complaints, except in regard to prices. The contract for nearly 200 tons of Plate Iron for locomotive purposes, has just been closed. We quote as follows: Common Plates, 2.3¢ @ 2.4¢; Tank Iron, 2.3¢ @ 2.4¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.85¢ @ 3¢; Flange Iron, 3.85¢ @ 4.25¢; Solid Fire Box, 4.85¢ @ 5¢; and Best Bloom, 5.5¢ @ 6¢.

Sheet Iron.—The demand is not of any special importance, and the condition of the trade is much the same as on date of our last report. We quote prices weak and market dull, as follows: Refined Sheet Iron, No. 26 to 28, 3.6¢ @ 3.7¢; No. 22 to 24, 3.4¢ @ 3.5¢; No. 16 to 21, 3.2¢; Best Bloom Sheets, No. 26 to 28, 5.4¢ @ 5.5¢; No. 22 to 24, 5.2¢; No. 16 to 21, 4.9¢ @ 5¢; Common Red Plates, 5-16 to 18, 2.3¢ @ 2.4¢; Refined Plates or Blue Annealed, 5-16 to 18, 2.6¢ @ 2.7¢; American, R. G., 5-16 to 18, 3.1¢ @ 3.2¢; Best Bloom, 5-16 to 18, 4.9¢ @ 5¢; Philadelphia Russia, 7¢ @ 7.5¢; A. Patent Platinized, 10½¢; B. Patent Platinized, 9½¢; Bloom Galvanized, 40¢; Refined Galvanized, 50 ¢.

Bar Iron.—The improvement noted in our last report seems to continue, although the business is still far from being active. Buyers seem to be thrown upon the local mills to a greater extent than formerly, and very little is heard now of purchases being made from distant points. The demand will no doubt also be for the best descriptions of iron, particularly for machine tool purposes, a class of trade which is beginning to show encouraging signs of improvement. There is still a demand for low-priced iron, but the time seems to be at hand when quality will be appreciated. We quote common iron at 1.6¢; Medium, 1.8¢ @ 1.9¢; Best Refined, 2¢ @ 2.1¢. Market quiet and steady.

Steel Rails.—The only feature of interest during the week has been the sale of 40,000 tons of Steel Rails to the Pennsylvania Railway Company, the price of which is understood to be \$40 cash at mills. This order will be divided among three companies on the line of railway, and in connection with other considerable contracts on hand will give the mills a full winter's work. The feeling in regard to prices seems to be steady and firm, but there is no probability of any important change of values, and we quote same as last week—average prices for small lots \$41 @ \$42.50 at mills. A sale by a Western mill of 5,000 tons at \$45, delivered in St. Louis, is also reported.

Iron Rails.—Business has been unusually quiet for some weeks past, and no sales have been made in lots of any magnitude. The mills are fairly employed, however, some of them are, in fact, quite full of business, while others are nearly bare of orders. There are the usual number of inquiries in the market, but there does not appear to be much prospect of any immediate change in the condition of the trade. The market may be quoted quiet and steady at former rates, say \$32 @ \$35, at mills, according to quality and terms of payment.

Old Rails.—There is a fair demand for Old Rails of good quality at the full rates recently quoted. Inferior descriptions are more difficult to place, as buyers discriminate carefully and prefer a good article even at an extreme figure. We do not hear of any sales on the spot, business is rather quiet and likely to continue so until after the holidays. Meantime we continue our last week's quotations, say \$19.50 @ \$20.50, according to quality and terms of payment.

Old Car Wheels.—There has been very little business done recently, and prices appear to be somewhat unsettled. The only sale reported within the past few days is a lot of 50 tons, costing about \$18 delivered here. We quote from \$17.50 @ \$18.50, according to quality.

Old Car Axles.—Nominal at \$24 @ \$26.

Scrap Iron.—The market is rather dull, and outside prices can be obtained only for very select quality. We quote: Cast, \$15 @ \$16, and Wrought, \$22 @ \$23.50.

Nails.—There is nothing special to note. The demand is moderate for the season of the year, but prices remain steady and unchanged at \$2.40 to the trade and 2.50 to consumers.

Old Metals.—The following prices are a fair average of the market at this date:

Heavy Old Copper	16 ¢ @ 17 ¢
Light Tinned Copper	15 ¢ @ 16 ¢
Copper bottoms	14 ¢ @ 15 ¢
Heavy Red Brass	12 ¢ @ 13 ¢
Light Red Brass	11 ¢ @ 12 ¢
Heavy Yellow Brass	11 ¢ @ 12 ¢
Light Yellow Brass	10½ ¢ @ 11½ ¢
Heavy Clean Pipe Lead	4 ¢ @ 4½ ¢
Light Clean Pipe Lead	3½ ¢ @ 4 ¢
Tea Lead, Light Paper	4 ¢ @ 4½ ¢
Tea Lead, Heavy Paper	4 ¢ @ 4½ ¢
New Zinc Clippings	4½ ¢ @ 5 ¢
Old Sheet Zinc	4 ¢ @ 4½ ¢
Red Brass Turnings	7 ¢ @ 8 ¢
Lead Dross	0½ ¢ @ 0¾ ¢
Spelter Dross	0½ ¢ @ 0¾ ¢
Plumbers' Lead Joints	5 ¢ @ 5½ ¢

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Dec. 18, 1877.

General business continues to lag, particularly in manufactured goods, the demand for which always falls off largely in December, and it is not likely that there will be any immediate improvement. There have been no failures or suspensions during the past week of any consequence, and we are in hopes that the financial troubles in iron circles are about over, although this feeling prevailed over a year ago. It is reported that the pipe mill of Evans, Dalzell & Co., recently failed, is about to be turned into a stock company, each creditor taking stock to the amount of his claim, and that the mill will soon be started up again and run in the interest of the creditors. The mill is a good one, having had all the latest improvements, and enjoyed an excellent reputation for turning out a superior character of goods. It is not likely that the old Eagle Mill (Mullen & Maloney, also failed), will be started up soon again—perhaps never—as the mill is an old one, and was quite recently considerably damaged by fire; and the Pittsburgh Iron Works, formerly the Pittsburgh Bolt Works, will no doubt take a good long rest, the parties recently running them having suspended. While these failures are, as might be expected, having a

bad influence in weakening confidence, there is at least one good effect resulting therefrom, and that is a decreased production. While it is a matter of no special importance, yet it is a fact worthy of notice that there have been but few failures or suspensions here recently among manufacturers outside of those engaged in the iron business.

Pig Iron.—No improvement in the demand, nor is it likely that there will be until about the middle of next month, or after stock-taking has been completed and semi-annual settlements got through with. Commission men all report business very dull; that there is no demand except for a few small lots for mixture, and prices are weaker in consequence, as might be expected, but for good first-class brands not notably lower. Stocks in the hands of consumers are light, and the supply in first hands is not large, but the outlook for any immediate improvement in prices is not very encouraging. As there still appears to be an overproduction, moreover, it is feared that even if an advance was made it could not be maintained, as there are quite a number of idle furnaces ready to blow in just as soon as there is a chance to get a new dollar for an old one. However, it appears to be very generally conceded that in no event are prices likely to go lower, as the cost of production has been reduced to the very lowest notch, and then at current rates, even to those furnaces most favorably located, there is little if any margin for profit. Eastern Coke Irons are still quoted at \$17.50 @ \$18, cash, and \$18 @ \$18.50, four months, for Gray Forge, and Bituminous Coal smelted, \$19.50 @ \$20, cash, and \$20 @ \$21, four months. It is difficult to quote foundry irons correctly. Nothing doing in Bostons.

Manufactured Iron.—The demand for all kinds of Finished Iron has fallen off considerably of late, as it always does in December, and it is probable the lull will continue until about the middle of January. The prospects are considered favorable for a good spring trade, as an increased consumption is confidently expected, and with a decreased production, a number of mills having been stopped owing to financial troubles, hopes of more remunerative prices are entertained. The most of the mills are still in operation, some of them working double turn, having been behind with their orders, but, as already intimated, but few new orders are now coming forward, as compared with a month ago. Prices for good stock may be fairly quoted as follows: Merchant Bars, 1.70¢ @ 1.80¢, 60 days; Sheet Iron, No. 24, 2.80¢ @ 2.90¢, 60 days; Hoop Iron, 2.50¢ @ 2.75¢, rates; Tank Iron, 2.50¢ @ 2.75¢, 60 days.

Nails.—As reported to The Iron Age by wire, the meeting of the Western Nail Association, held here last week, took more definite action than was expected. In addition to advancing prices 10¢ per keg, it was agreed to curtail production by running half time during the next 60 days. While the advance was very generally unexpected by the outside public, it could not have been so to makers, as is evident from the fact that they had but very few orders booked at the time of the advance. It is estimated that there were not more than 18,000 or 20,000 kegs booked at the time in question for future delivery, more than one-half of which were sold by one concern west of here. Hence, our manufacturers are in condition to take advantage of the advance. We now quote at \$2.35, 60 days, with 2 ¢ off for cash for less than 200 kegs, and an abatement of 10¢ per keg for 200 kegs lots and upward.

Horse and Mule Shoes.—The market continues quiet, as it always is at this season of the year, and the demand will likely continue of a hand-to-mouth character until about the latter part of next month. Shoeborger & Co. still quote Juniata, in 100 keg lots, at \$3.80 and \$4.80, cash.

Wrought Iron Pipe.—There is a continued fair demand, although orders are not coming forward as freely as they did in October and November. Owing to the depression in the oil business, there are but comparatively few new oil wells being put down; hence the demand for oil-well tubing and casing has fallen off largely. Discounts are still quoted at 55 ¢ to 60 ¢ in an ordinary way, and 62½ ¢ to very large buyers.

Steel.—There is a continued fair inquiry for all the leading grades as well as the most of the specialties, and notwithstanding this is the dull season, the mills here still appear to have about all they can do. There is reason to believe that the production here in Pittsburgh has been fully equal to, if not larger, this year than that of any former year, as the mills generally have been running up to their full capacity. Prices remain about as last quoted, and while there is quite a range, it should be borne in mind that there is more of a range in quality than in former years. Tool Steel, 11½¢ @ 12½¢; Tire, do., 5¢ @ 6¢; Plow, 6¢ @ 10¢; Machinery, 6½¢ @ 8½¢.

Steel Rails.—The rails for the Pittsburgh and Lake Erie Railroad have been purchased from a rail mill at Cleveland (Ohio) at the very low price of \$41, cash, deliverable at the west end of the road. The seller has the privilege of delivering them at any time between now and spring, and the rails are to be first class.

Scrap.—The movement in all kinds of Scrap continues light, as it usually does this month, and prices are reported weaker, but without quotable change.

Window Glass.—At a meeting of the association here last week, it was agreed to do away with freight equalization and to increase discounts instead. We now quote at 70 ¢ and 10 ¢ by the car-load and 60 ¢ and 20 ¢ for smaller lots. Orders have fallen off considerably this month, but the fall trade, so far as volume is concerned, was better this fall than it has been during same time for a number of years.

Petroleum.—The refining business, so far as Pittsburgh is concerned, continues dull and unsatisfactory, as in addition to a light demand, prices are unremunerative, and those refiners outside of the Standard combination are unable to do much. It is alleged that the Standard has very decided advantages over outside refiners, both in freights on the railroads and pipeage through the pipe lines.

BOSTON.

Dec. 15.—Iron.—Pig is easier, and to effect sales concessions would have to be made by holders. The demand runs very light. We quote: \$21.50 for No. 1; \$20 @ \$20.50 for No. 2, and \$19.50 @ \$20 for Gray Forge. Scotch Pig is dull, with a very light demand. Bar continues unchanged, quoting \$43 @ \$45 for Refined, and \$35 @ \$36 for Common. American Rails, \$35 @ \$38. Nails are in light demand at unchanged prices. Sheet is selling at 3¢ @ 3½¢ per lb. Russia is quiet at 10½¢ @ 11¢. We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13½¢ @ 14¢ for Cast; 9¢ for Blister; and 8¢ for Machinery. Copper has been dull, as is usually the case toward the end of the year. For manufacturers we quote: New Sheathing, 28¢; Bolts and Braziers, 30¢; Yellow Metal Bolts, 25 ¢ @ 25½¢; do. Sheathing, 20¢. Lead is dull, and we leave our quotations nominally unchanged. We quote: Pig, 4½¢ @ 5¢, currency. For Domestic Sheet, 8¢; Pipe, 7½¢; Tin-Lined Pipe, 15¢; Bar Lead, 7¢; all of these, excepting Pig, are subject to the usual trade or 10 ¢ discount. Antimony is steady at 13¢, gold, for Boston spot lots, and Spelter is easy, closing at \$6 on the spot for 10-ton lots. Tin is very dull, but prices are no lower. We quote: Straits, 16½¢ @ 16¾¢; Banca, 18½¢ @ 19¢; Refined English, 16½¢ @ 16¾¢, gold. We quote Plates: Charcoal, I. C., \$7 @ \$7.50; Coke, \$6.25 @ \$6.50; and Terne, \$6.50 @ \$7, gold.—Commercial Bulletin.

BALTIMORE.

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of Dec. 17: We have no change in the Pig Iron market. Business dull, and prices unchanged:

Baltimore Charcoal	28.00 @ 30.00
Virginia	28.00 @ 30.00
Anthracite No. 1	28.00 @ 30.00
No. 2	18.00 @ 19.00
No. 3	17.00 @ 18.00
Mottled and White	15.00 @ 16.00

Messrs. WYETH & BROTH, Iron and Steel Merchants, 46 and 48 South Charles street, report us the following prices, under date of Dec. 17: Trade rules much as reported for some time past, with the exception of increased firmness in prices, and hardening in values; otherwise unchanged at annexed figures:

AMERICAN REFINED BAR IRON.

4 to 6 wide by ¼ to 1 thick	1.95 @ 2.00
Round and Square, ordinary sizes	1.95 @ 2.00
from ¼ to 2 inclusive	1.95 @ 2.00
Hoop iron, 1½ wide and upward	2.30 @ 2.40
Band iron, from ¼ to 4 in. wide	2.40 @ 2.50
Bar-shoe iron ¼ to 1 wide by ¼ to ½ thick	3½¢ @ 3½¢
Norway Nail Rods	5½¢ @ 6¢
Black Diamond Cast Steel, Flats, Squares and Octagons, ordinary sizes	14½¢ @ 15¢
Machinery Steel	8 ¢ @ 8¢
Cast Spring Steel	7½¢ @ 8¢
Homogeneous Steel Plate	8½¢ @ 9¢
Perkins' Horse shoes, per keg of 100 lbs.	\$4.00 @ 4.25
" Mule shoes	2½¢ @ 2½¢
R. R. Spikes	2½¢ @ 2½¢
Common Horse Nails	per lb. 14¢ @ 18¢
Putnam Horse Nails	per lb. 10 ¢ 8 ¢ 7 ¢ 6 ¢
Globe Horse Nails	per lb. 23 ¢ 24 ¢ 25 ¢ 26 ¢

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Dec. 17: There has been considerable sales of foundry grades of Pig Iron during the past few days at quotations. Receipts and sales of Charcoal Pig Iron very light. Prices are maintained:

Va. Cold-blast Charcoal, Cold-short	\$21.00 @ 25.00
Va. " " Neutral	20.00 @ 21.00
Anthracite, No. 1 X	20.00 @ 21.00
No. 2	19.00 @ 20.00
No. 3 (West Virginia)	22.00 @ 23.00
No. 4 X	21.00 @ 22.00

ST. LOUIS.

Special report by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of Dec. 13: Pig Iron is growing a little dull. Prices remain about the same, although large lots of iron can be bought at lower prices than our quotations. Very few of our furnaces are in blast, and the present prospect indicates an early advance in Missouri Irons. There is but little cheap Missouri Iron in the market, and when the supply fails to meet the demand the price must go up.

	No. 1.	No. 2.	Mill.	White and Mott'd
Missouri Stone Coal	\$22.00	\$21.00	\$20.00	\$19.00
Missouri Charcoal	28.00	21.00	20.00	19.00
Tennessee Charcoal, very soft	28.00	21.00	20.00	19.00
and strong	23.00	21.00	20.00	18.50
Hanging Rock Charcoal	25.00	24.00	23.00	22.00
H. R. Charcoal, Cold-short	24.00	23.00	22.00	21.00

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Hanging Rock Coke	25.00	24.50	24.00	23.50	23.00
West Virginia, Coke	23.50	23.00	22.50	22.00	21.50

COLD-BLAST CHARCOAL—All Numbers.

Hanging Rock	4 mos.	\$25.00 @ 38.00
Tennessee	4 mos.	26.00 @ 30.00
Kentucky	4 mos.	26.00 @ 30.00
Missouri	4 mos.	26.00 @ 30.00
Georgia	4 mos.	26.00 @ 30.00
Alabama	4 mos.	26.00 @ 30.00
Assorted Bar Iron	2.00 rates	
No. 1 Railroad	1.00 per h'd	
Machinery Scrap	80 ¢ @ 85 ¢	
Heavy Cast	65 ¢ @ 65 ¢	
Light Cast	55 ¢ @ 55 ¢	
Old Rails	19.00 @ 20.00	
Old Car Wheels	4 mos.	17.00 @ 18.00

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Dec. 17, write us as follows: We have no change to chronicle since last report. Purchasers are buying to tide over New Year's, and are indisposed to purchase largely for future delivery. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	\$23.00 @ 24.00
No. 2	20.00 @ 21.00

No. 1 Southern, Charcoal	20.00 @ 21.00
No. 2	19.00 @ 20.00
No. 1 Hanging Rock, Stonecoal and Coke	20.00 @ 22.00
No. 2	19.00 @ 20.00
No. 1 Southern, Stonecoal and Coke	19.00 @ 20.00
No. 2	18.00 @ 19.00
" American Scotch "	20.00 @ 22.00
Silver Gray	18.00 @ 19.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	18.50 @ 19.50
No. 1 Stonecoal and Coke, Cold-short and Neutral	18.00 @ 18.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	17.50 @ 18.00
No. 1 and Indiana Red-short	21.00 @ 22.00
White and Mottled	15.00 @ 16.00
Neutral	15.00 @ 16.00

BAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	14.00 @ 15.00
Alabama and Georgia, Cold-blast	25.00 @ 26.00
Kentucky, Cold-blast	25.00 @ 26.00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Dec. 15, write us as follows: **Pig Iron.**—The demand for Forge Irons has been good, the market at certain times being very active. The supply, however, continues generally ample to meet all purchases, and there has been, consequently, no stiffening in prices. Foundry grades have been in fair request as usual. The demand from the foundries has fallen off during this month in anticipation of the customary invoicing January 1. Quotations nominally unchanged.

HOT-BLAST FOUNDRY.

Hanging Rock No. 1 Charcoal	\$23.00 @ 24.00
Hanging Rock No. 2 Charcoal	21.00 @ 22.00
" No. 1 Coke	22.00 @ 23.00
" No. 2 "	20.50 @ 21.00
Virginia, No. 1, Stonecoal	20.00 @ 21.00
" No. 2 "	21.00 @ 22.00
Ala. and Tenn., No. 1 Charcoal	21.50 @ 22.50
" No. 2 "	20.50 @ 21.00
Red-short, No. 1 Coke	23.50 @ 24.00
Shawnee No. 1, Coke	23.50 @ 24.00
Alice No. 1, ex	23.50 @ 24.00
Alice No. 2	22.50 @ 23.00

FORGE IRONS.

Hanging Rock No. 1 Charcoal	20.00 @ 21.00
Hanging Rock No. 2 Coke	19.00 @ 20.00
Virginia, No. 1	19.00 @ 20.00
Ala. and Tenn., No. 1 Charcoal	20.00 @ 21.00
Red-short, No. 1 Coke	20.50 @ 21.00
Cold-short, No. 1 Stonecoal	17.50 @ 18.50
Old Rails, prime, cast	21.00 @ 22.00

CAR WHEEL AND MALLEABLE.

Hanging Rock	33.50 @ 38.50
Southern and Western Brands	28.00 @ 30.00

ORE.

Virginia Hematite (Washed)	cash. 4.25 @ 4.50
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CHATTANOOGA.

Special report by S. E. LOWE, Dealer in Metals, under date of Dec. 17: The inquiry for Cold Short Iron has been about as usual, although as a general thing business has been restricted and dull; the failure of some of the Northern concerns has had a depressing effect, and houses that could have obtained credit a month ago would now be required to pay cash. In Merchant Iron the demand has been more than the ability of the mills to supply, and orders for Texas and Arkansas have been declined. The same can be said also of nails. In Spikes and Fish Bolts the necessary requirements of the railroads have been supplied. In Ores, negotiations are now pending for a sale of 20,000 tons per month at \$2.10. The demand for Foundry Irons to go South is steady.

COKE.

No. 1 Foundry, extra	\$20.00 @ 21.00
No. 1 Foundry	19.00 @ 20.00
No. 2 Foundry	17.00 @ 18.00
Gray Forge	15.00 @ 16.00
White and Mottled	14.00 @ 15.00

HOT-BLAST CHARCOAL.

No. 1 Foundry, extra	20.00 @ 21.00
No. 1 Foundry	19.00 @ 20.00
No. 2 Foundry	17.00 @ 18.00
Gray Forge	15.00 @ 16.00
White and Mottled	14.00 @ 15.00

COLD-BLAST CHARCOAL.

Car Wheel Metal	22.50 @ 27.50
" extra	24.50 @ 29.50
Forge Metal	17.50 @ 22.50
Muck Bar	20.00 @ 24.00
Old Car Wheels	17.00 @ 18.00
Old Rails per ton	16.50 @ 17.50
Brown Hematite Ore 50 to 56 per cent.	1.75 @ 2.25
Red Fossiliferous Ore 50 to 56 per cent.	1.50 @ 1.75
Nails	2½¢ @ 2½¢
Track Bolts	30 ¢ @ 30 ¢
Bar Iron	20 ¢ @ 20 ¢
R. R. Spikes	2½¢ @ 2½¢
Light Rails	2½¢ @ 2½¢

CHICAGO.

L. R. HULL & Co., 95 Washington street, under date of Dec. 17, report as follows: Demand is light, buyers confining their purchases to small lots sufficient to carry them to close of year. Quotations unchanged:

LAKE SUPERIOR CHARCOAL.

Lake Superior No. 1	\$24.00 @ 25.00
" No. 2	23.00 @ 24.00
" No. 3	22.00 @ 23.00
" No. 4 and 5	23.00 @ 24.00

AMERICAN SCOTCH.

Mahoning Valley, No. 1	24.00 @ 25.00
No. 2	23.00 @ 24.00
Shawnee, No. 1	24.00 @ 25.00
No. 2	

accepted for small parcels. Coal is very depressed, owing to heavy supplies and want of demand. A cargo of Cardiff has been taken at 14 guineas, and of Australian at 10 guineas 3/4 ton. Tonnage.—Disengaged tonnage continues large and settlements have been on a limited scale, while the tendency of rates is downward.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Dec. 3, 1877.

THE END

of the year is now so near that we know two things must take place—the one being an increased amount of business up to Christmas in the manufacturing branches, and the other a marked decrease in the purchases of all kinds of raw materials. The one is the natural result of the clearing of order books by the end of the year, or a desire to let the men make the best wages possible prior to the holidays, and the other the equally natural effect of the known inconvenience of having large quantities of materials on hand just prior to stock-taking and the balancing of books. It is thus a plain fact that any inferences we may just now draw as to the possibilities of the new year may be rather fallacious, inasmuch as in the majority of instances we cannot feel sure about the premises from which we set forth. In some trades the future is a matter of anxiety, while in others it is, to a certain extent, assured up to March or April next. This, however, is by no means the rule. It chiefly applies to the steel rail works, and certainly, in no sense, to the iron trade, which is duller, more stagnant and more unprofitable than ever. The worst result of this lethargy is that great numbers of men, women and children are at this present time in great distress of body, for their suffering has not been wholly within the past few months, but has extended in a patient manner over the last two years. In the Forest of Dean the women have sent a memorial to the Queen on the subject. For these and others I am afraid the

MERRY CHRISTMAS,

now so high at hand and so eagerly looked for by those whose substance is sufficient, will be anything but cheerful, unless, as I believe, a national effort is made to alleviate the misery which undoubtedly exists in many of the ironworking districts of England, Scotland and Wales. And this reminds me that by the time this is in type the White Patriarch will be close upon us, so that you will be good enough to allow me, yet once more, to wish all my many readers in the States and elsewhere the British "compliments of the season—a Merry Christmas and a Happy New Year! May we long travel the course of the months together!"

THE PRINCIPAL SUBJECT

of interest, to my mind, at this time is the singularly prominent place which is filled in the newspapers by the "Work and Wages" column. Not for many months—I had almost said two or three years—has this column been so notably filled. There are disputes of all kinds on hand all over the country, and the indications are that more trouble of the same nature is but just hidden beneath the surface. For instance, the official journal of

THE IRONWORKERS' UNION,

in its issue of Friday last, complains that several managers of works in different parts of the country have endeavored to induce their workmen to accept a lower rate of wages than that fixed by the arbitrator, "under the plea of their inability to obtain orders owing to the depression of trade," and proceeds to say that it does not believe "any concession on the part of the workmen at the present time would tend to induce orders to be given out, or a single extra ton of iron bought." The journal then dubs such action "dishonorable," and winds up by hoping that the employers will work "harmoniously" with the men. Then, again,

THE MINERS

are passing through troubled waters, although their tribulation is not so severe, in most instances, as that of their ironworking brethren. In Northumberland, the coal-owners have notified a general reduction of wages of 12 1/2 per cent., and have served the notices upon the men to-day. The men have already demurred, but a joint meeting has not altered the decision of the masters. About 40,000 men are affected by the notices. In Durham, the accountants under the Arbitration Board have now ended the investigation undertaken for the purpose of determining the wages basis, and report that they find the average selling price of all the coal brought to bank to have been 5/2 1/4 per ton—a decrease of 1d. per ton as compared with the previous four months. The men's wages, being already at the lowest figures of the sliding scale, are not affected thereby. The Leicestershire Miners' Association, at one time a strong organization, is now broken up, and its remaining 86 members have divided the £260 balance of funds in hand. In Durham, the Consett Iron Company have been compelled to lay off two of their collieries, and in South Yorkshire, South Wales and other districts there are many minor disputes. From the last balance sheet, now before me, of "The Northumberland Miners' Mutual Confidence (sic) Association," I see there are 12,605 "full" members, and 1559 "half" members, at the 67 collieries belonging to the association. In the expenses for the quarter, Mr. Burt's salary is down for £125; the two secretaries, £28. 7/ each; "deputations," £16; "strike rent," £138; then "sacrificed members," £41, and "17 pits stopped," £488. 11/8. These miners have now agreed to pay an extra levy to support those out of work in their own locality.

THE OTHER DISPUTES

are dragging along rather wearily. The masons' strike in London is still unsettled, and the combative efforts of the masters to secure foreign labor are continued. During last week 130 German and Italian masons

were brought in, besides five from New York. Of 27 masons who had been obtained from the provinces, eight have been induced to join those on strike. Some of the American workmen have sent for their wives and families. The number of "strikers" now "on the roll" is 560. The Clyde iron shipbuilders' strike is expected to be terminated to-day, on the understanding that the men are to give way, and then the masters will consider the question of an advance immediately the trade will bear it. In various parts of Lancashire the weavers and spinners are being asked to accept lower wages.

A SHEFFIELD TRADE OUTRAGE

has been somewhat peculiarly ended, or at all events adjourned *à die in diem*, owing to the fact that the prosecutor is missing. Briefly stated, the facts are these: A grinder named Hibberd persisted in employing a youth named Priest, and paid no heed to the admonitions and intimidations of Robert Holmshaw, the secretary of the union, who was subsequently summoned for the intimidation he had offered to Hibberd. Holmshaw was committed for trial at the sessions, but when the sessions arrived, behold! Hibberd was not forthcoming. Abundant evidence proved his departure to have been sudden, and the following letters were put in, as proof of his latest whereabouts. I give the letters not only as curiosities, but as the opinions of a much-wronged (!) man:

New York, October 22, 1877.

Dear wife and child I write these few lines hoping to find yours well as this leaves me at present thank God I am sore that I left home with out seeing you and William I was forced to go I hope you got the money I left you I posted a letter at Cork Ireland for the derictions of any kelys husband I hope you received it if not I left the money 10/- for you with William base he lives in well medow road allen street we will land on Monday we have had 5 vere ruff days on board the ship it is vere fine now the food we got in the sterage was not fit for hogs but I am getting the best of food I am working for the suoks and the baker I will write to you when I get to my gureys and I am going to connect maredon if you wish to come be fore spring you may will send for you in the interne-dute cabin for the sterage is not fit for you tell William to be a good boy and will send him a nice hat please write by the return of post derict to meridan. Conn. post office for me no more at present from your effectioned husband kisses for you and wilam x x x

Nov. 6 1877

West Meriden

Dear Wife I Right these few lines hoping they will find you Well as they leave me At present I landed in New York On Oct 29 We had a very rough pasage they Was All for the Salt lake I Was Very uncomfortable Over you and My Son I am sorry I had to leave you in such haist I left 10 pounds With William Hayes for you in your next letter Send Me Word if you got it Dear Wife this is a very fine place and you must get Ready to come I got work the first day I got hear I think you had Better Wate till Spring as the see is so rough and it is so could it Osters Kill you thear is plenty of grapes and Osters Hear I am living with a Sheff Man Jack fox and I pay One pound a Week for My Board I shall Be 6 Weeks before I get any pay—I Can nat earn as much hear as I can At home I have sent you 2 letters Send Me Word if you get them tell Willie, to be a good Boy and I will send in a New hat Dear Wife give My best Respects to All friends and tell them to Back Rodgers if a comes to Sheffield to Run I Want you to send Me Anney Kelley Husband I please send Word how you ar getting On So no more from your loving Husband

G. H. Hibberd

x x x for you and My Son

Derect Box 21

West Meridan

Conn.

Let us fervently hope that the "osters" continue plentiful and that "all friends" did not "back Rodgers," for I don't think that was the name of the "last winner" here.

DEATH OF AN IRONMASTER.

I have to record the death of Mr. F. W. Kitson, of Monkbridge Iron Works, near Leeds, and the Airedale Foundry, of the same town. Mr. Kitson was vice president of the Iron and Steel Institute and of the Institution of Mechanical Engineers, besides being a member of many other similar bodies. He was educated as an engineer at the celebrated Airedale Foundry, but in 1854, with his brother James, established the Monkbridge Iron Works which have since become very prosperous. His funeral was largely attended by ironmasters and others.

AMERICAN AND BRITISH EXPORTS

are compared by a correspondent of the Sheffield Telegraph to your disadvantage, inasmuch as you only exported last year iron and steel manufactures worth £2,324,674, machines and agricultural implements worth £1,341,736, and steam engines valued at £131,155; whereas the British exports of the same kind in the same year were respectively, £25,747,271, £6,427,814 and £2,631,333.

MESSRS. MUNDELLA & BRITAIN

have again been exchanging blows—on paper—and have each set forth their views with much self-satisfaction, but they have been so verbose that it would be utterly impracticable for me to reproduce their facts, figures and arguments. Mr. Brittain still contends that France is going ahead of us, but Mr. Mundella holds the contrary, and in support thereof puts forward the fact that the French exports for the first ten months of 1876 were £120,507,280, whereas for the ten months of this year they only reach £113,135,400, leaving a falling off of £7,371,880. Mr. Mundella also says that the French exports of tools and works in metal fell from £3,648,000 in 1872, to £2,880,000 in 1876; of machinery, from £1,064,000 to £912,000, and of wrought and cast iron and steel, from £1,452,000 to £244,000. He further attributes inaccuracy to Belgian returns, which are greatly exaggerated by the officials of that country.

AN EXTRAORDINARY FATALITY

occurred the other day in Wales, at a place called Rhosgoch, where a bridge, under-

mined by continuous floods, gave way and so caused a train to fall into the river underneath. Three deaths have resulted, and more must have been caused had there been any passengers in the train. Such accidents as this are of exceedingly rare occurrence in this country.

THE PENINSULAR AND ORIENTAL COMPANY, one of our greatest Eastern carrying lines of steamships, has made a profit of £134,301 for the year, being a recovery of nearly £100,000 on the twelve months' trading, but £140,000 under the profits for 1874-5.

A GREAT FIRE

took place last week at the Heaton Norris goods depot of the London and Northwestern Railway Company, where £200,000 of damage was done; the contents of the warehouse was destroyed including 10,000 bales of American cotton.

THE WEEK'S FAILURES

have been rather numerous, but they have not largely affected the iron or hardware trades. The largest has been that of Hooper & Sons, of London and Oporto, wine merchants, who owe £250,000 and have large assets. The other stoppages include S. & J. Leonard, Birmingham oil and color men, owing £8000; James Shaw, woolen manufacturer, Huddersfield, owing £14,000; and Thomas Lees, weighing machine and steel-yard maker, of Birmingham, owing £10,000. The last stoppage is attributed to colonial losses. In the estate of J. F. & E. Van Camp, builders, London, owing £230,000, five shillings in the pound is proposed. In the liquidation of B. H. Harris & Co., metal merchants, of Birmingham, who failed in September, owing £35,000, a first dividend of 7/ in the pound is offered.

SCOTCH PIG IRON

has been a little stronger during the week, but there has been no particular change in makers' prices. There are now 90 furnaces in blast in Scotland, as against 116 last year, and 166,392 tons in Connal's stores, as compared with 93,107 tons. The total foreign shipments up to date amount to 258,586 tons, and coastwise, 162,248 tons—a total decrease this year of 14,537 tons. During the year, to date, 273,185 tons of Middlesboro' pig have been brought into Grangemouth—an increase of 71,694 tons over last year. American freights are quiet.

Writing on December 1, James Watson & Co. (Glasgow) said: The market for Scotch pig iron warrants opened dull on Monday at 51/11, prompt cash, and 52/10, 10 days. On Tuesday the price improved to 52/1, cash; while on Wednesday the advance continued, and 52/2 1/2, cash, and 52/6, one month, was paid. Yesterday the tone was very firm at 52/3, cash, and up to 52/6, 10 days. To-day the market advanced to 52/4, cash, closing quieter, with sellers at this figure; buyers offering at 1d. per ton less. Shipments last week were 7596 tons, against 10,276 tons in the corresponding week of 1876. We quote:

	No. 1.	No. 2.
G. M. B. at Glasgow	53/9	51/3
Gartsherrie, "	50/3	54/3
Coltness, "	56/6	55/6
Summerlee, "	57/	55/6
Langloan, "	58/6	53/6
Carnbroe, "	55/	55/
Calder, at Port Dundas	59/	51/5
Glenarnock, at Ardrossan	59/	53/6
Eglington, "	54/6	51/6
Dalmellington, "	54/	52/
Shotts, at Leith	61/	55/6
Kinnell, at Bo'ness	51/6	51/6

The prices of Wm. Galt & Co., and of Swan Bros. (Limited) are similar. Last week's shipments from the Clyde included £7000 of machinery for Trinidad, and £1600 for the Mediterranean; £1800 of castings for the Mediterranean; £1200 pipes; £3000 of bars (of which £2770 for Singapore) and £3000 of "miscellaneous."

The whole of the furnaces at Portland Iron Works, Hurford, near Kilmarnock, belonging to the Eglinton Iron Company (William Baird & Co.) are to be extinguished, and the men discharged. There are six furnaces at these works, but only two have been in operation of late. The Glasgow Iron Company are about closing their Motherwell Iron Works, or will work merely from day to day, as is now the case at the Coalbridge and Mossend Iron Works.

THE NORTH OF ENGLAND

iron trade remains in a depressed and distressed condition. Near Darlington alone 2100 men are out of work, from the Darlington, Skerne and South Durham Iron Works and the Darlington Wagon Works. A meeting of the inhabitants was held last week to consider means for alleviating the existing distress, when it was stated that in the Albert Hill iron district out of 1400 houses, fully half were in downright poverty and misery. The Mayor (of Fry, L'Anson & Co.) said they only employed half of their ordinary number of men, and trade was worse instead of better. Mr. Pratt, of the Skerne Iron Works, said they had only three-fourths of the men on, and that not full time. Mr. Wilson, of the Darlington Iron Company, said they had 140 men less than at the beginning of the year, and prospects were very poor. After considerable discussion it was determined to take immediate steps for ascertaining and relieving the existing distress by the opening of soup kitchens and other means. Six hundred pounds were subscribed in the room.

THE TRADES OF SHEFFIELD.

There can be little or no doubt, as I stated last week and on previous occasions, that the ordinary iron trade of this town and district was never in a worse condition than at present. This is proved not only by the recent difficulties of the Northfield Iron Company, near Rotherham, but also by the action which has been taken by Messrs. William Cooke & Co., Limited, Sheffield, to reduce the wages of their puddlers—a step which they have publicly stated to have been rendered necessary by "the severe competition and the long-continued depression." This competition is not only existent in this locality, but all over the country, and is more particularly keen in the race for the Lancashire and Liverpool shipping orders, which were at one time the principal sustenance of some of our local concerns in this branch of business. The North Staffordshire and Lancashire competitors in the markets named, and manage to carry off most of the orders, even though ordinary bars be offered at £5. 15/ which

leads me to remark, parenthetically, that in my last letter I was made to say that "Messrs. Cooke & Co. offer 8/2 for puddling common bar iron," instead of 8/9 per ton. A further proof of the dullness of which I have just spoken is furnished by the statement that the Sheepbridge Coal and Iron Company, near Chesterfield, are discharging numbers of workmen, and are placing others on short time, for the purpose, principally, of curtailing the production, which is clearly shown to be too large by the great stocks of iron which have accumulated at these and other works. That this company should feel compelled to take such measures is all the more striking when it is borne in mind that it has its own blast furnaces, iron ore deposits and collieries, all conveniently situated for economical production, and when the good reputation of the company's pig iron is also remembered. If what I am told be true, we shall shortly hear of other movements of this kind.

I am told that good steel rails can now be had at something under £6. 10/ per ton at the works, or very little over that figure delivered at Hull ready for shipment. I believe I am correct in stating that 6000 tons of rails for India have already been sent off from one local works. In other directions the mills are busily going on Russian account.

Mr. Ward (at present Master Cutler) head of the firm of Ward & Payne, has done a capital thing by sending out a special commissioner of his on to Australia in order to ascertain and report whether the sheep shears and other goods made by the firm are suited to and liked in that market. That is precisely what all large manufacturers ought to do and what some others here are about to do on their own account. There is a fair inquiry for cutlery for your market—in which, as an old traveler remarked to me the other day, best Sheffield goods will always sell. He says that Wostenholm's command the West, Rodgers' the East, and Jonathan Crookes' the South, and they won't sell elsewhere. Another "Sham" knife case has come before the local County Court judge, in which Geo. Wostenholm & Son are sued by a cutler for £32, as damage for breach of contract. Judgment is reserved as yet.

STAFFORDSHIRE AND BIRMINGHAM.

The iron trade of these districts remains very quiet, and is certain to continue so during the remainder of this year. All prices are unaltered, but are weak all round. Bars are very difficult to sell—common at any prices under and over £6, medium at £7 to £7. 10/ and best marked at the nominal quotation of £8. Sheets of most kinds are in fairly good request. Singles can be had in any quantity at £3 to £3. 10/, and better qualities at £9 to £10. 10/. For hoops there is a small call at £7 and upward, and for tube strips at £7. 10/ to £7. 15/. A few of the Staffordshire and Shropshire houses are shipping sheets to Australia, New Zealand and India. In the hardware branches there is a fair amount of activity, but the purchases of materials are being discontinued as the stock-taking period approaches. There is a large production of edge tools of all kinds, japanned goods, electro-plated goods, rolled metallic goods, agricultural implements, chandeliers and all kinds of gas fittings. With Spain and Austria there is more work doing, but less on account of orders from South Australia. With the West Indies, particularly with Cuba, there is a good business, and from the Cape recent advices are rather more satisfactory. Indian indents are moderately good. From France few new commissions are being received just now.

SOUTH WALES AND MONMOUTHSHIRE continue quiet, with certain exceptions, which have recently been alluded to in these letters. Ebbw Vale is conspicuously busy, seven rail mills being still going, three of them on best heavy rails. At Dowlais and Rhymney a good deal of Irish and Spanish ore is being imported, and also some iron slag from Hamburg. At the Dos Works, Newport, a reduction of 10 per cent. has been notified. The total iron and steel exports last week were 2200 tons, among which was a small cargo to the United States. The coal exports in the same period reached 76,643 tons. It is proposed to carry a bridge over the River Severn, from Newnham and Arlingham, at a cost of £25,000. There would be two spans, one 400 feet and 60 feet above high water and the other 300 feet and 50 feet above high water, and the breadth to be 9 feet. There is rather more doing in tin plates, chiefly for your market.

THE METAL MARKETS

have again been quiet during the week, there having been no movement of note except in a few lots of tin. Messrs. Von Dadelzen & North say: Copper has further declined, Chili bars having been sold at £63 for Lot and G. O. B., and £63. 10/ for Urmeneta. Austrian is also lower; 50 tons Wallaroo coke reported sold at £73; Burra quoted at £72. About 1200 tons of Cape ore sold by tender at 12/3; 2000 tons Mexican at 12/, and a parcel of Spanish precipitate at 12/ 1/2 unit. English dull; tough, £69 @ £70, selected, £70 @ £71; strong sheets, £74. Tin.—Australian, after falling to £66, cash, has been in more demand, and a good business was done yesterday at £66. 10/ spot, and £67, forward. The market closed with buyers at the top; sellers scarce and looking for better prices. Straits has been sold at from £66. 5/ to £67, closing at the best. The Dutch Trading Company's sale of Banca went at an average of 40 fl. 75 c., equal to about £69 in London (just £10 1/2 ton lower than it went last year); 41 fl. is now asked for Banca. In Billiton, 2000 slabs were sold since the sale at 39 1/2 fl., sellers now asking 39 1/2 fl. English ingot, £73 @ £74; bar, £74 @ £75. Tin plates offered at low prices, but in better demand; the export continues very large. Lead flat, with sellers of English pig at £10. 10/ @ £10. 15/; soft Spanish, without silver, £10 @ £10. 2/6. Spelter.—Nothing reported; £19. 5/ @ £19. 7/6 for ordinary brands. Quicksilver, £7. 5/ 1/2 bottle. Antimony from £50 to £51.

The Mining Journal remarks: Copper.—The course of the market has been downward, and Chili bars have been sold at £63. Other descriptions are also slightly depreciated, and politics seems to be exercising a most unfavorable influence upon the mar-

ket. There is nothing to complain of now in the present prices, but the amount of business is so very insignificant that it is thought by many that prices must drop £2 or £3 before anything like a general revival sets in. Lead.—This metal is very quiet, and no better prices can be quoted upon last week's rates. Spelter quiet but steady. Tin plates unchanged, but orders are limited. Quicksilver.—There is no change, and the position remains in all respects as last reported. Price, £7. 5/.

Latest Liverpool prices are:

Iron, f. o. b. in Liverpool, per ton.	£ s. d.	£ s. d.
Merchant bar	6 0 0	6 10 0
" in Wales	5 10 0	6 0 0
Staffordshire	7 0 0	9 0 0
Hoop	7 10 0	8 10 0
Sheet	8 10 0	9 10 0
Nail rod	7 0 0	7 10 0
Bar, best crown	7 0 0	8 0 0
Boiler plates	9 0 0	10 0 0

Tin Plates, f. o. b. in Liverpool, per box.

£ s. d.	£ s. d.
Charcoal, I. C.	1 3 6 to 1 3 6
Coke, I. C.	0 17 6 to 0 19 6

Copper, delivered in Liverpool, per ton.

£ s. d.	£ s. d.
Bolt and sheathing	82 0 0 to 82 0 0
Tile	75 0 0 to 75 0 0
Tough cake	76 0 0 to 76 0 0
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A New Lightning Rod and Insulator.—From the results of practical experiments made with a large electric machine, Prof. J. C. Chambers, of Cincinnati, Ohio, has constructed a new lightning rod and insulator, which, while meant to afford safety to the buildings to which it is attached, will cost only about half as much as the ordinary pattern. Prof. Chambers does not connect his rod with the earth, but receives the discharge on one uplifted end of a rod, insulated carefully from the roof of the house and running along its entire length, and dispels it into the atmosphere from the other end, similarly constructed and ending in three points. The inventor is evidently misled by the results of experiments performed under conditions very different from those which one finds in nature. To suppose that lightning will strike one end of a rod and pass off the other into the air, argues a limited knowledge of the phenomena with which the inventor is dealing. It is the earth which attracts lightning, and the best way to deal with it is to give it a straight and easy road to the earth from any point which is liable to receive the shock.

Manufacture of Sulphuric Acid.—M. Kuhlmann, Jr., in his report to the French Government on the chemical products at the Centennial Exhibition, states that in the economical production of sulphuric acid in the United States much progress still remains to be made. He points to the universal use, in Europe, of cupriferos pyrites instead of sulphur, which our manufacturers here must import from Sicily. The use of cupriferos pyrites makes it possible for European manufacturers to produce the acid at excessively low prices. Similarly, Europeans have succeeded in effecting a great economy in the amount of nitre which they use, the consumption being now 2 parts to 100 parts of acid, against 5 formerly. The industries which chiefly consume sulphuric acid in this country are: the manufacture of alum, of sulphate of quinine of pharmaceutical preparations, of superphosphates and the refining of petroleum. With the lowering of the price of sulphuric acid, the manufacture of soda would certainly be greatly developed.

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Water's Improved Pruning Implements for 1878.
Special rates given on application for export trade. Length of pole 4, 6, 8 and 10 feet. Weight 5 to 24 lbs. Sample Pruner, 3s. Send for Illustrated Circular and Reduced List.
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Water's Improved Pruning Implements for 1878.
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Best and cheapest ever invented. Saves all cutting and welding. Will reset a tire one inch at single heat. Adapted to tires of any size or diameter. Price, \$12. Circulars free.
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PATENT CONVEX
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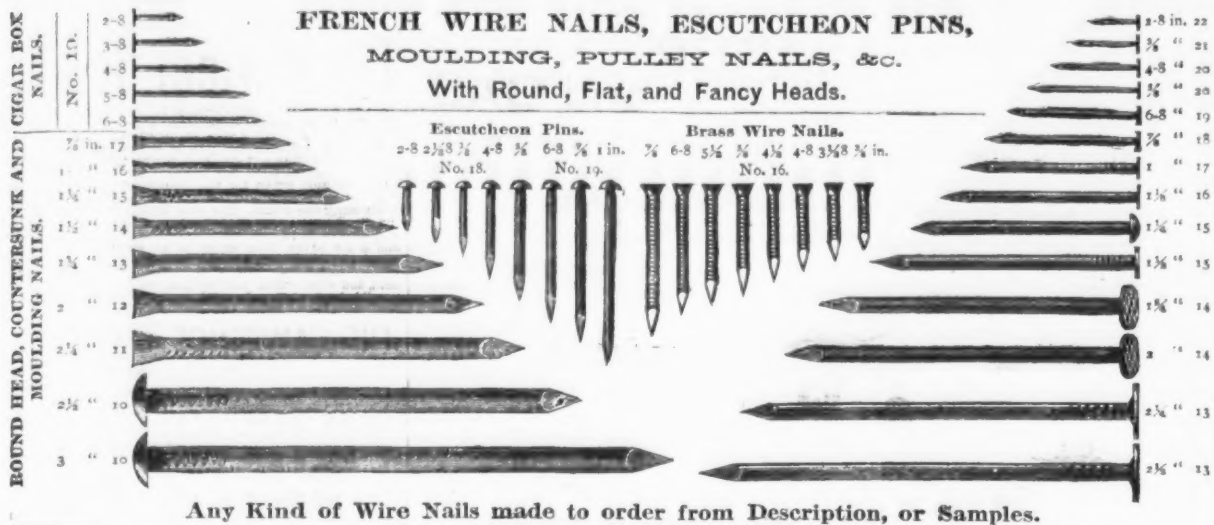
1st. It can be used as an ordinary Smoothing Iron. 2d. It is a Fluting Machine as well as a Smoothing Iron. 3d. The Fluting Attachment being made of brass, and convex in form, it has all the advantages of the crank machine. 4th. It combines the two articles in one, taking up the room of but one machine, and is always ready for use.

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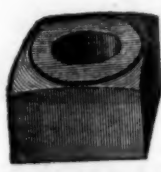
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SCREW WRENCHES.

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Celebrated AUGERS and BITS.



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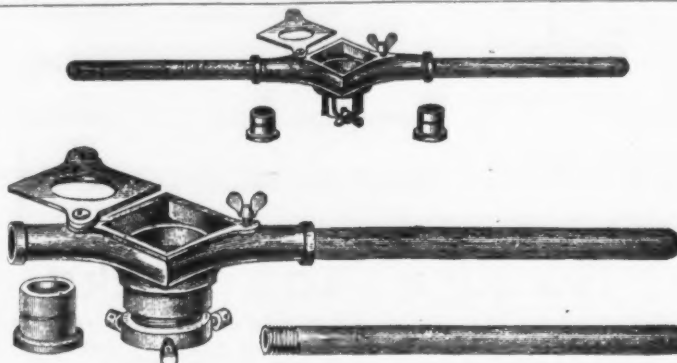
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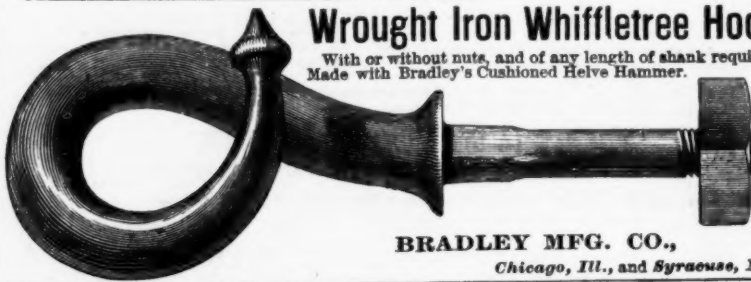
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With or without nuts, and of any length of shank required.
Made with Bradley's Cushioned Heave Hammer.



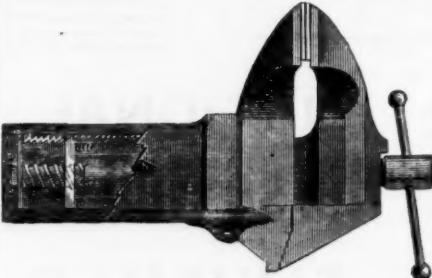
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Simple and durable. No chance of
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HEATER AND PURIFIER,**

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Delivers feed water at 210° Fahrenheit.

Prevents formation of scale. Removes old scale.

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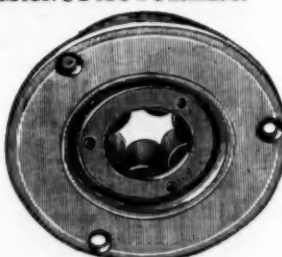
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When fitted into our Improved Iron Shafts they make the strongest and best Shafts and Bushing in
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We call your attention specially to our new patent end-
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and at the same time serve as an extra handle; and
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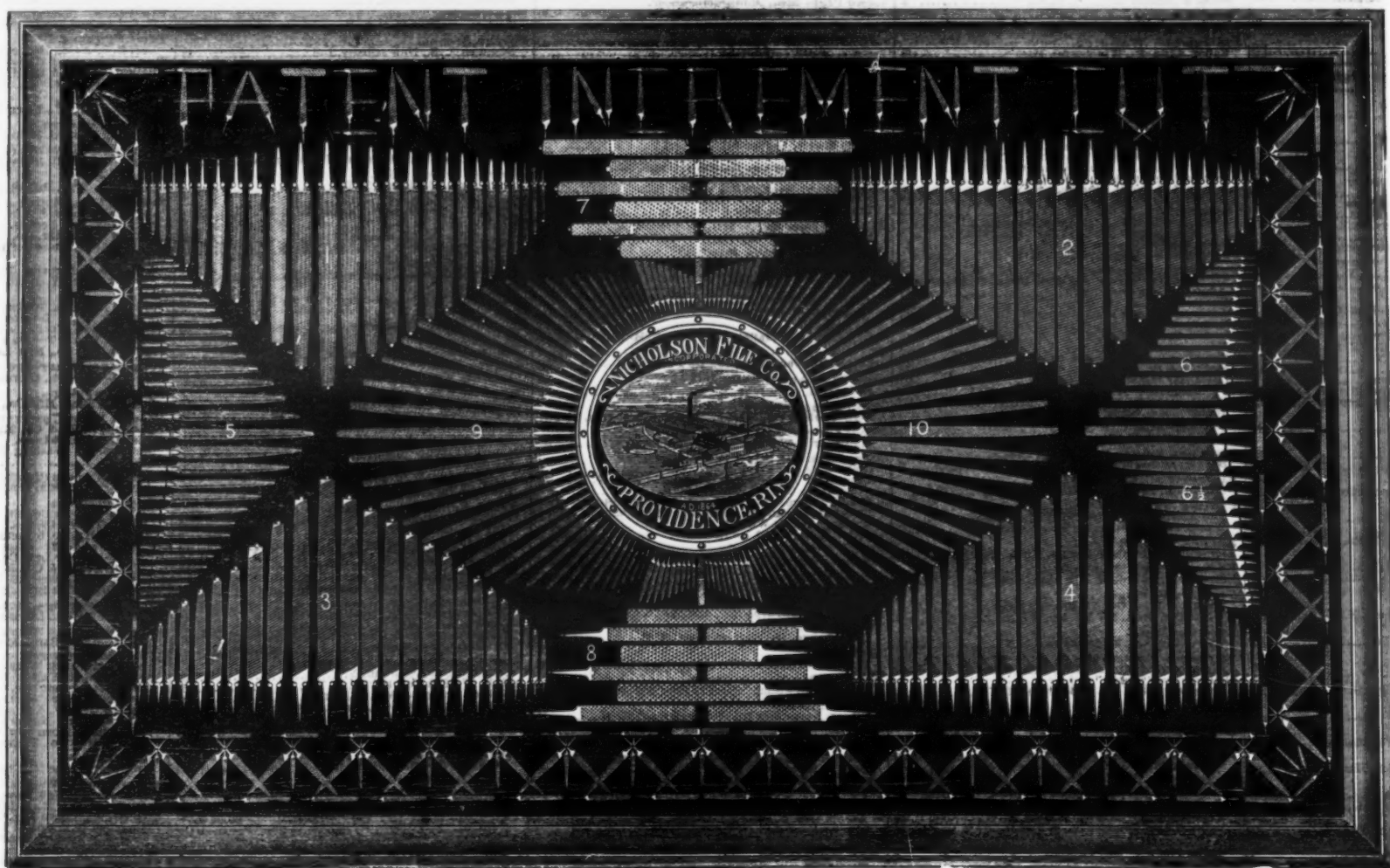
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1.—Half Round.
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3.—Mill.
4.—Flat.

5.—Triangular.
6.—Pillar.

6½.—Knife.
7.—Plain Rasps.

8.—Tanged Rasps.
9.—Round.

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Manufacturers of

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Galvanized Square and Ornamental
Conductor Pipe
RIBBED TUBING
Stamped & Press
Work to order.
Correspondence Solicited.

Steel Castings,

Light and heavy Steel Castings of superior metal, solid and homogeneous. All work guaranteed. Send for circular.

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Manufacturer of Patent

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FOR
Railroad Switches,
Freight Cars,
AND THE HARDWARE TRADE
All sizes, with Brass and Steel
Keys, with and without chains.

PASSENGER CAR LOCKS,
Bronzed, Nickel-Plated and Japanned.
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Catalogues and Samples sent upon application.



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Illustrated Catalogue sent on application.

PECK & SNYDER'S Patent Self-Adjusting American Club Skate



No. 1.
SIZES: 8-8½, 9-9½, 10-10½, 11-11½ inches.
The above are made with blued steel Foot Plates and Clamps, with the best tempered Runner and polished Blades. We make no inferior grade of the American Club Skate, the cheapest No. 1 being as good as the best No. 3, except in point of finish and workmanship.
No. 1, Price per pair, \$5.00.
No. 2, same as No. 1, only full nickel-plated, " " 7.00.
No. 3, full polished and bright finished throughout, and nickel-plated, " " 7.00.

Peck & Snyder's "Clipper" or N. Y. Club Skate.



No. 1.
SIZES: 8-8½, 9-9½, 10-10½, 11-11½ inches.
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No. 3, full polished and bright finished throughout, and full nickel-plated, " " 5.00.
Special discounts to the trade.
Before you order write for our new Skate Catalogue containing list of job lots of Skates.
Circulars furnished to our Dealers in lots of 100 to 1000, with their imprint as agents, without charge.

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ALSO LANE'S PORTABLE COFFEE ROASTER
Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

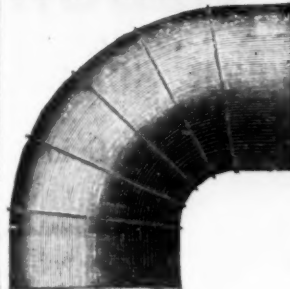
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Also sold by leading wholesale houses.
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HOGEN ELBOW COMP'Y,

MANUFACTURERS OF PATENT STAMPED

Stove Pipe Elbows.



The Hogen Elbow has no CHIMPS, CAVITIES or ANGLES, which cause accumulations that rust or corrode the iron; it is also easily polished and kept clean, its surface being smooth and regular on all sides. The Hogen Elbow forms the arc of a circle, and invariably holds the pipe securely at right angles, without the use of rivets.

OFFICE & WORKS—Foot of Wason St., on Lake Shore
CLEVELAND, O.

Skates! Skates! Skates!

For the Million, of various kinds, at
LOW PRICES.



Heating & Cooking Stoves.



No. 1 Heater.

THE ONLY
Safe, Odorless and Practical
STOVE
For Family and Manufacturing
Purposes.



No. 0 Cook.

Send for circular.

MANUFACTURED BY

The Florence Machine Co., FLORENCE, MASS.

PRINCIPAL OFFICES: 39 Union Square and 49 Murray St., New York; 476 Washington St., Boston; 59 State St., Chicago; 1210 Ridge Ave., Philadelphia.

W. B. BELKNAP & CO.,

Louisville, Ky.,

Iron and Steel Merchants.

FLOW SLABS,
FLOW SHAPES,
BULL TONGUES,
LAP RINGS,
REPAIR LINKS,
COH. and C. S. BOLTS,
NUTS,
WASHERS,

DOUBLE TREES,
SINGLE TREES,
FLOW HANDLES,
FLOW BEAMS,
CLEAVES,
SHACKLES,
GRASS RODS,
HEEL BOLTS.

Our Single Trees are made with large center irons, so as to readily admit the shackles or clevis.
Correspondence promptly attended to.

New York Wholesale Prices, December 19, 1877.

HARDWARE.

[illegible][illegible]

Devil's Chicks - Danbury	each	30.00	dis	30
Morris's Beach Patent	doz	40.00	dis	30
Adjustable	each	31.00	dis	30
E				
Edge Beaters	✓ doz	\$5.00	dis	30
National	✓ doz	\$4.50	dis	30
School	✓ doz	35.00	dis	30
Genuine Chester - Regular Nos.	✓ doz	15.00	dis	30
Washington Mills - Flour and FF	✓ doz	15.00	dis	30
Washington Mills - Regular Nos.	✓ doz	15.00	dis	30
Flour	✓ doz	15.00	dis	30
Washington Mills, Grain	✓ doz	15.00	dis	30
Hampton Emery Grain	✓ doz	15.00	dis	30
E				
Enameled and Tinned Ware				
Kettles	dis	40	dis	30
Sauce Pans	dis	40	dis	30
Flour	dis	40	dis	30
Tinned Sauce Pans	dis	40	dis	30
E				
Escutcheons				
Same discounts as Door Locks				
Brass Thread	dis	60	dis	30
F				
Fenn's				
Fenn's Cork Stops	dis	40	dis	30
Star	dis	40	dis	30
Fraser's Patent Petroleum	dis	40	dis	30
Wood and Metallic	dis	40	dis	30
Enterprise Mfg. Co., Self-Measuring	dis	40	dis	30
F				
Felloe Plates	✓ doz	15.00	dis	30
F				
American File Co.	\$5.00 to \$20.00	dis	30	
Auburn	\$5.00 to \$20.00	dis	30	
Nicholson	(Nicholson List)	dis	30	
Heller & Bros.	\$5.00 to \$20.00	dis	30	
Black & Co. - Same File Co.	\$5.00 to \$20.00	dis	30	
Jewett's	\$5.00 to \$20.00	dis	30	
Jewett's Carr	\$5.00 to \$20.00	dis	30	
Stube	\$7.00 to \$20.00	dis	30	
Butcher's	\$5.00 to \$20.00	dis	30	
Black & Co. - Same File Co.	\$5.00 to \$20.00	dis	30	
Fisher's	\$5.00 to \$20.00	dis	30	
Moss & Gamble	\$5.00 to \$20.00	dis	30	
Turner & Co.	\$5.00 to \$20.00	dis	30	
H. D. Stinson & Sons (new list)	dis	40	dis	30
Boynton's Cant.	dis	40	dis	30
Rothery	dis	40	dis	30
F				
Putnam's				
Knox Imperial	each	\$2.50	dis	30
Knox Imperial	each	\$2.50	dis	30
Knox Imperial	each	\$2.50	dis	30
Peelless, 4-inch Rolls	4.75 each			
Improved Knox (Climax), 4-inch	2.05 each			
Eagle, 3 1/2-inch Roll	\$15.00	dis	30	
Empire	\$4.00 each			
Eureka, No. 1, 7-inch roll	6.75 each			
Crown, 4 1/2-inch Roll, \$2.25 6-in.	\$2.75 6-in.			
Domestic Fluter	1.50 each			
Combined Fluter and Sad Iron	✓ doz	15.00	dis	30
F				
Fluting Scissors	dis	40	dis	30
F				
Force				
Empire	dis	40	dis	30
Kerstetter Portable Force Co.	dis	40	dis	30
Hay	new list	dis	30	
Patent A. I.	dis	40	dis	30
F				
Fruit and Jelly Presses				
Enterprise Mfg. Co.	dis	40	dis	30
Burghard, P. S. & W., new list	dis	40	dis	30
No. 1	dis	40	dis	30
No. 2	dis	40	dis	30
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Dixon's Lead	gross	4.50 net
"Lumber	gross	4.50 net
Picture Nails and Knobs	dis	50c
Head Argent's List	dis	50c
Foraldis	dis	50c
Judd's List	dis	45c
Pinking Irons	dis	45c
Plating Machine	dis	45c
Astor Plating Machine	dis	45c
Crown Plating Machine	dis	45c
Planes and Plane Irons	dis	45c
Plane quality	dis	45c
Second	dis	45c
Bailey's Patent Adjustable, new list Jan. 77	dis	45c
Defiance Adjustable, new list	dis	45c
D. R. Barton Tool Co.	dis	45c
Handy	dis	45c
Plane Irons, Butcher's	dis	45c
Buck Bros.	dis	45c
Buck Bros.	dis	45c
Auburn Tool Co.	dis	45c
Greenfield Tool Co.	dis	45c
Defiance	dis	45c
D. R. Barton Tool Co.	dis	45c
Middletown Tool Co.	dis	45c
Ohio Tool Co.	dis	45c
Spear & Jackson's	dis	45c
Handy Tool Co.	dis	45c
Plow Bits, Greenfield Tool Co.	dis	45c
Pliers and Nippers	dis	45c
Button's Patent	dis	45c
Staple Nippers, No. 1, 2, 3; No. 2, 3, 4	dis	45c
Gas Pliers	dis	45c
Eureka Pliers and Nippers	dis	45c
Steel	dis	45c
Plumbs and Levels	dis	45c
Stanley R. & L. Co.'s Non-Adjustable	dis	45c
Chapin's	dis	45c
Standard Rule Co.'s Non-Adjustable	dis	45c
Johnson's Patent Adjustable	dis	45c
Davis' Patent	dis	45c
Post Hole and Tree Augers	dis	45c
Eureka Digger	dis	45c
Post Hole, 8 in. and 10 in.	dis	45c
6 in. and 8 in. Post Hole	dis	45c
10 in. and 12 in. Post Hole	dis	45c
Potato Farmers, &c.	dis	45c
Bay State	dis	45c
Tool Co. Reeler and Slicer	dis	45c
Pulleys	dis	45c
Hoist Axle	dis	45c
Hot Foot, 8 in. and 10 in.	dis	45c
Jap'd Screw	dis	45c
Brass Screw	dis	45c
Hay Fork	dis	45c
Clothes Line	dis	45c
Solid Eye, 4 in. and 5 in.	dis	45c
Swivel, 5 in. and 6 in.	dis	45c
Douglas Caterer, etc.	dis	45c
S. R. F.	dis	45c
Union Mill Co. and Pitcher	dis	45c
Rams	dis	45c
Garden Engines	dis	45c
Punches	dis	45c
Belt or Drive	dis	45c
Pring	dis	45c
Bemis	dis	45c
Solid Timbers	dis	45c
Riding Drive, Wrought Bars	dis	45c
Iron, Painted, 7 foot 9 in.	dis	45c
for R. E. Hangers	dis	45c
Rakes	dis	45c
Case Sides	dis	45c
8 in. 5.75 10 12 14 16 18 20	dis	45c
5 in. 4.00 6 8 10 12 14 16 18 20	dis	45c
Razor Straps	dis	45c
Evans	dis	45c
Imitation Emerson	dis	45c
Staple	dis	45c
Chapman	dis	45c
Torrey's	dis	45c
Rivets	dis	45c
Iron and Tinned	dis	45c
Steel	dis	45c
Copper Rivets and Burs	dis	45c
No. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	dis	45c
Rivet Sets	dis	45c
Rond and Lever Scrapers	dis	45c
Revolving	dis	45c
Rollers	dis	45c
Stair	dis	45c
Rollers	dis	45c
Barn Door	dis	45c
Acme (Anti-Friction)	dis	45c
Rope	dis	45c
Manufacturers' List	dis	45c
1/4 inch and 1/2 inch	dis	45c
3/4 inch and 1 inch	dis	45c
1 1/4 inch and 1 1/2 inch	dis	45c
1 3/4 inch and 2 inch	dis	45c
2 inch and 2 1/2 inch	dis	45c
2 1/2 inch and 3 inch	dis	45c
3 inch and 3 1/2 inch	dis	45c
3 1/2 inch and 4 inch	dis	45c
4 inch and 4 1/2 inch	dis	45c
4 1/2 inch and 5 inch	dis	45c
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71 1/2 inch and 72 inch	dis	45c
72 inch and 72 1/2 inch	dis	45c
72 1/2 inch and 73 inch	dis	45c
73 inch and 73 1/2 inch	dis	45c
73 1/2 inch and 74 inch	dis	45c
74 inch and 74 1/2 inch	dis	45c
74 1/2 inch and 75 inch	dis	45c
75 inch and 75 1/2 inch	dis	45c
75 1/2 inch and 76 inch	dis	45c
76 inch and 76 1/2 inch	dis	45c
76 1/2 inch and 77 inch	dis	45c
77 inch and 77 1/2 inch	dis	45c
77 1/2 inch and 78 inch	dis	45c
78 inch and 78 1/2 inch	dis	45c
78 1/2 inch and 79 inch	dis	45c
79 inch and 79 1/2 inch	dis	45c
79 1/2 inch and 80 inch	dis	45c
80 inch and 80 1/2 inch	dis	45c
80 1/2 inch and 81 inch	dis	45c
81 inch and 81 1/2 inch	dis	45c
81 1/2 inch and 82 inch	dis	45c
82 inch and 82 1/2 inch	dis	45c
82 1/2 inch and 83 inch	dis	45c
83 inch and 83 1/2 inch	dis	45c
83 1/2 inch and 84 inch	dis	45c
84 inch and 84 1/2 inch	dis	45c
84 1/2 inch and 85 inch	dis	45c
85 inch and 85 1/2 inch	dis	45c
85 1/2 inch and 86 inch	dis	45c
86 inch and 86 1/2 inch	dis	45c
86 1/2 inch and 87 inch	dis	45c
87 inch and 87 1/2 inch	dis	45c
87 1/2 inch and 88 inch	dis	45c
88 inch and 88 1/2 inch	dis	45c
88 1/2 inch and 89 inch	dis	45c
89 inch and 89 1/2 inch	dis	45c
89 1/2 inch and 90 inch	dis	45c
90 inch and 90 1/2 inch	dis	45c
90 1/2 inch and 91 inch	dis	45c
91 inch and 91 1/2 inch	dis	45c
91 1/2 inch and 92 inch	dis	45c
92 inch and 92 1/2 inch	dis	45c
92 1/2 inch and 93 inch	dis	45c
93 inch and 93 1/2 inch	dis	45c
93 1/2 inch and 94 inch	dis	45c
94 inch and 94 1/2 inch	dis	45c
94 1/2 inch and 95 inch	dis	45c
95 inch and 95 1/2 inch	dis	45c
95 1/2 inch and 96 inch	dis	45c
96 inch and 96 1/2 inch	dis	45c
96 1/2 inch and 97 inch	dis	45c
97 inch and 97 1/2 inch	dis	45c
97 1/2 inch and 98 inch	dis	45c
98 inch and 98 1/2 inch	dis	45c
98 1/2 inch and 99 inch	dis	45c
99 inch and 99 1/2 inch	dis	45c
99 1/2 inch and 100 inch	dis	45c
100 inch and 100 1/2 inch	dis	45c
100 1/2 inch and 101 inch	dis	45c
101 inch and 101 1/2 inch	dis	45c
101 1/2 inch and 102 inch	dis	45c
102 inch and 102 1/2 inch	dis	45c
102 1/2 inch and 103 inch	dis	45c
103 inch and 103 1/2 inch	dis	45c
103 1/2 inch and 104 inch	dis	45c
104 inch and 104 1/2 inch	dis	45c
104 1/2 inch and 105 inch	dis	45c
105 inch and 105 1/2 inch	dis	45c
105 1/2 inch and 106 inch	dis	45c
106 inch and 106 1/2 inch	dis	45c
106 1/2 inch and 107 inch	dis	45c
107 inch and 107 1/2 inch	dis	45c
107 1/2 inch and 108 inch	dis	45c
108 inch and 108 1/2 inch	dis	45c
108 1/2 inch and 109 inch	dis	45c
109 inch and 109 1/2 inch	dis	45c
109 1/2 inch and 110 inch	dis	45c
110 inch and 110 1/2 inch			

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Patent No. 7.....	dis 42.00
Patent No. 8.....	dis 42.00
Patent No. 9.....	dis 42.00
Patent No. 10.....	dis 42.00
Patent No. 11.....	dis 42.00
Patent No. 12.....	dis 42.00
Patent No. 13.....	dis 42.00
Patent No. 14.....	dis 42.00
Patent No. 15.....	dis 42.00
Patent No. 16.....	dis 42.00
Patent No. 17.....	dis 42.00
Patent No. 18.....	dis 42.00
Patent No. 19.....	dis 42.00
Patent No. 20.....	dis 42.00
Patent No. 21.....	dis 42.00
Patent No. 22.....	dis 42.00
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Patent No. 24.....	dis 42.00
Patent No. 25.....	dis 42.00
Patent No. 26.....	dis 42.00
Patent No. 27.....	dis 42.00
Patent No. 28.....	dis 42.00
Patent No. 29.....	dis 42.00
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Patent No. 31.....	dis 42.00
Patent No. 32.....	dis 42.00
Patent No. 33.....	dis 42.00
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Patent No. 45.....	dis 42.00
Patent No. 46.....	dis 42.00
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Patent No. 48.....	dis 42.00
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Patent No. 66.....	dis 42.00
Patent No. 67.....	dis 42.00
Patent No. 68.....	dis 42.00
Patent No. 69.....	dis 42.00
Patent No. 70.....	dis 42.00
Patent No. 71.....	dis 42.00
Patent No. 72.....	dis 42.00
Patent No. 73.....	dis 42.00
Patent No. 74.....	dis 42.00
Patent No. 75.....	dis 42.00
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Patent No. 81.....	dis 42.00
Patent No. 82.....	dis 42.00
Patent No. 83.....	dis 42.00
Patent No. 84.....	dis 42.00
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Patent No. 86.....	dis 42.00
Patent No. 87.....	dis 42.00
Patent No. 88.....	dis 42.00
Patent No. 89.....	dis 42.00
Patent No. 90.....	dis 42.00
Patent No. 91.....	dis 42.00
Patent No. 92.....	dis 42.00
Patent No. 93.....	dis 42.00
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Eureka, no		65.00
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Excelsior, with Folding Bench.		70.00
" No. E, for Set Sub.		70.00
Keystone No. 1, Wood Frame, no Gear.		50.00
" No. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.		50.00
" No. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	Purchase Gear.	60.00
" No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	Common Gear.	57.00
Fearless, No. 1.		74.00
New Climax, No. 3 Wood Frame, Purchase Gear.		67.00
" No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.		78.00
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The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing and in railway management; their works are the most complete in the world, with all the late improvements, and are located in the best Bessemer metal district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

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THE TRADE MARK, IN ADDITION
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GRANTED A.D. 1766, BY THE
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Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750

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W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.

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We always have on hand a full assortment of

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Self-Locking Stencil Letters and Figures.

Observe this patented



Assorted sizes for Straight, Circular and Hal
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Superior to All Other Stencils.

Also Inks, Brushes and all kinds of Stencils and

Letters in large variety, at wholesale. These patent

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suit, O. G. Bryant vs. S. W. Reese & Co., before

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Sole owner of the three original patents in the United States and Canada, and exclusive manufacturer

Sold by Hardware Jobbers everywhere. Circulars, samples and price lists with discounts on application

E. M. BOYNTON,

Manufacturer of all kinds of

First-Class Saws, Saw Frames, Cross-Cut Handles, Tools, Files, &c. Also Sole
Proprietor and Manufacturer of the Genuine Patent Lightning Saw.

80 BEEKMAN STREET, NEW YORK.

TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor, Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corlies, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chair man of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876.
\$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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Of every description, including

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Manufacturer of every kind of

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SAWS.

Union Avenue, Tenth and Ainslie Streets, BROOKLYN, E. D., N. Y.

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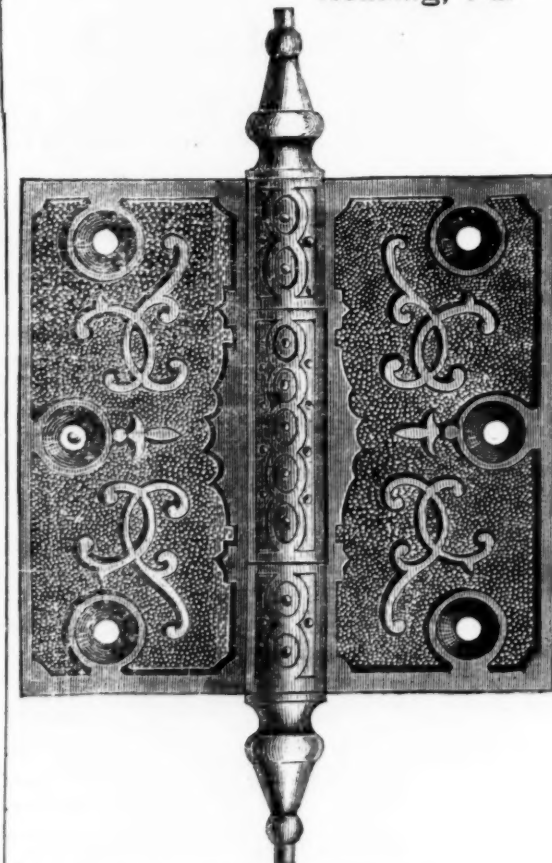
Manufacturers of

Movable Toothed Circular Saws,
PERFORATED CROSS-CUT SAWS
And SOLID SAWS of all kinds. Trenton N. J.

READING BUTT WORKS.

RICK BROTHERS,

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CHAMPION
HOG RINGER
RINGS and HOLDER.
Only double Ring ever
invented. The only
Ring that will effectually
keep Hogs from
rooting. No sharp
points in the nose.

Ringers, 75c. Rings, 50c. 100. Holders, 75c. Huskers, 15c.

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MANUFACTURERS OF EVERY VARIETY OF
DRILLED CAST BUTTS, AXLE PULLEYS, BRONZED AND JAPANNED BRACKETS,
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APPLE PARERS, WALL SAFES or CYLINDER RINGS, and BUILDERS' and SHELF
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GRINDSTONES.

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FOR

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FINE TOOLS

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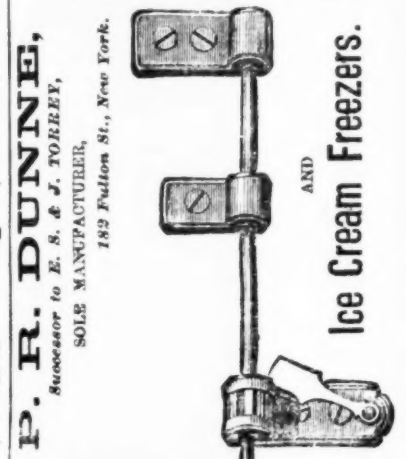
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Dealers in

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Retail Yard on D. L. & W. Railroad, cor. Grove and

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Rough & Ready
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CLIPPER SCYTHES,
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**CHALLENGE
DOOR & GATE SPRING.**

PATENTED
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American Coffee, Spice and Drug
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Make the

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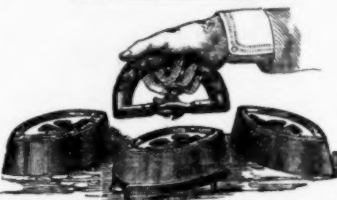
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price list.



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COLD HANDLE SMOOTHING

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IRONS.

Are made by

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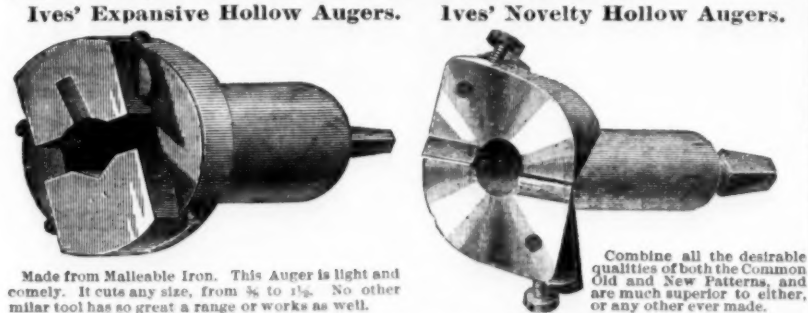
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The internal arrangement of these Braces has been so changed as to avoid any foundation for a claim of infringement. Manufactured under our own patents, they are strong, simple, and cannot get out of order. We guarantee the goods and those who buy them. Numbers same as in our Catalogue.

Ives' Expansive Hollow Augers. Ives' Novelty Hollow Augers.



Made from Malleable Iron. This Auger is light and
comely. It cuts any size, from 3/8 to 1 1/2. No other
milar tool has so great a range or works as well.

Combine all the desirable
qualities of both the Common
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are much superior to either,
or any other ever made.



These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a Combination which has no equal. For Circulars and Price List, address,

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

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Established in 1839.

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SCREW WRENCHES.

Our goods have been very
much improved recently, by
making the Bar WRENCH, as
shown in the cut, which makes
a 12 in. Wrench as strong as a
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A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back

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Our goods are manu-
factured under Patents dated Feb-
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cut), which makes the strongest Ferrule
fastening known.

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Our Agents, GRAHAM & HAINES, 113 Chambers St.
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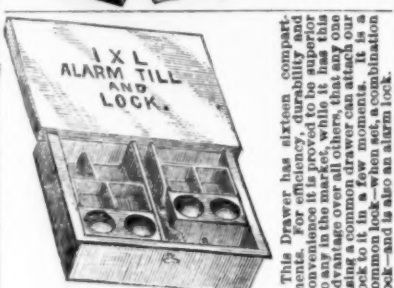
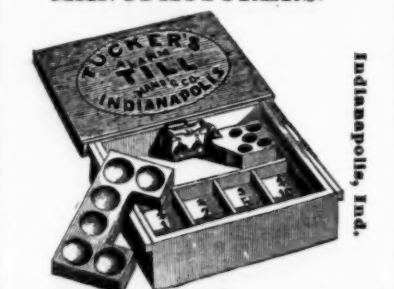
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Brass, Galvanized and Ship Chandlery

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Manufacturers of Copper, Brass, and Iron Rivets; Com-
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MANUFACTURED BY

The American Lock Mfg. Co.,

Are the most SECURE and DURABLE ever made.

SECURE

Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the
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DURABLE

Because we use no Springs to break or get out of place.

THEY HAVE

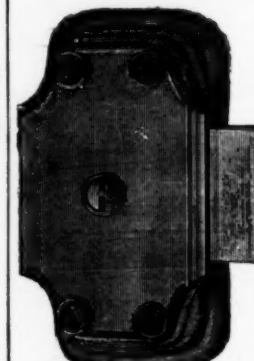
STERLING METAL KEYS

That will not corrode or wear, and are

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FULL SIZE OF KEY.



Upright Rim Dead Locks,
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Fronts and Knobs,
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Solid Bronze Padlocks.

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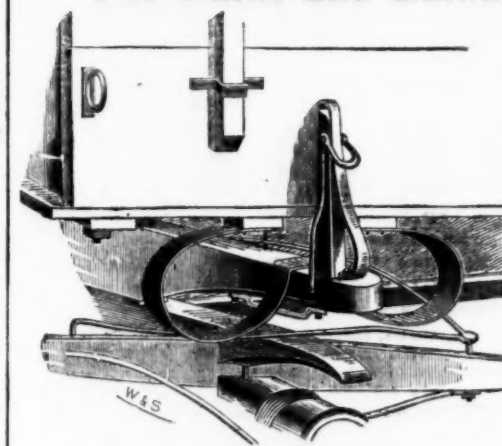
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BOLSTER SPRINGS

For Farm and Lumber Wagons.

Pulliam's Patent.



Made of the best steel, and war-
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Are attached by four bolts through
the bottom of the bed. Lift off the
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work. Operates equally well whether
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necessity of spring seat. Affords
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Price, per set of four springs, \$6.50.
Liberal margin to Wagon Manufac-
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MANUFACTURERS OF

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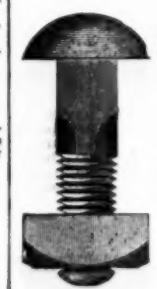
ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

AND

TAP BOLTS.



160,000
are now in use,
GIVING
Perfect Satisfaction.

MANUFACTURED BY
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OVER
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SOUTH BEND IRON WORKS. South Bend, Ind.

CLARK'S PATENT EXPANSIVE BITS

Two sizes: large size Boring, $\frac{3}{4}$ to 6 inches; small size Boring, $\frac{1}{4}$ to $2\frac{1}{2}$ inches.



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AMERICAN HARDWARE.

Hydraulic Jacks and Punches, ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

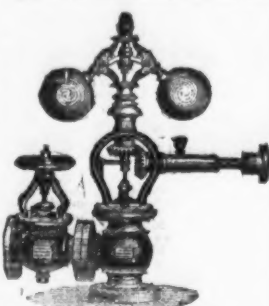
THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors in use to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best, Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List,

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For dimensions of Governor, see Illustrated Price List.

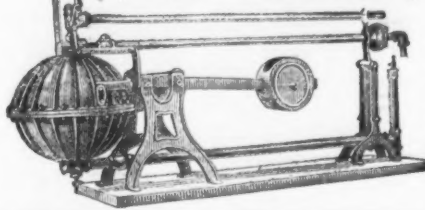


THE JUDSON PATENT Improved Steam Governor.

No Charge for Boxing & Cartage.
JUNIOUS JUDSON & SON, Rochester, N. Y.

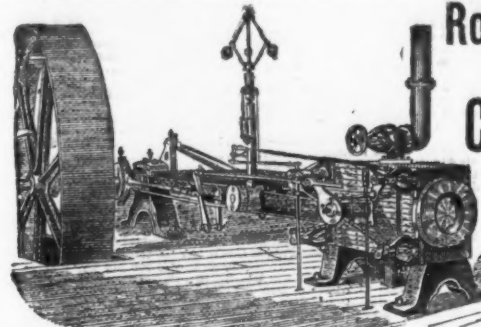
Size, Inch.	Plain.	Brilliant Finish.	Extra for Speed.	Stop Valve.
1/2	\$16 00	\$18 00	\$1 90	..
3/4	18 00	20 00	1 90	..
1	20 00	22 00	2 00	\$5 00
1 1/4	23 00	26 00	2 25	6 00
1 1/2	26 00	30 00	2 50	8 00
2	31 00	35 00	3 75	10 00
2 1/2	36 00	41 00	3 25	12 00
3	40 00	45 00	3 50	14 00
3 1/2	45 00	51 00	3 75	16 00
4	50 00	57 00	4 25	19 00
4 1/2	59 00	67 00	4 50	23 00
5	69 00	78 00	5 00	28 00
5 1/2	80 00	90 00	5 50	34 00
6	90 00	101 00	6 00	40 00
6 1/2	105 00	117 00	6 50	46 00
7	120 00	133 00	7 00	54 00
7 1/2	142 00	156 00	8 00	65 00
8	175 00	192 00	9 00	79 00
9	198 00	218 00	10 00	..
10	210 00	240 00	13 00	..

The Albany Steam Trap.



This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
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Robt. Wetherill & Co
CHESTER, PA.

Corliss Engine

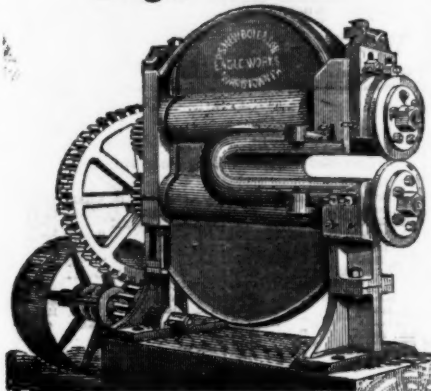
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Boiler Makers.

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IMPROVED ROTARY SHEARS,
Rolling Mill, Blast Furnace, Flour
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Machinery. Air Compressors,
Ore Washers and Brick
Machines.



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Rotary Shears for Plates and Circles.
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Ernst Stridberg, Sweden.
Lewis Daisell & Co., Pittsburgh, Pa.
H. A. Beale & Co., Parkersburg, Pa.
Rolling Mill & Blast Furnace Plants & Engines.
Merion Furnaces, Conshohocken, Pa.
Aurora Furnace, Wrightsville, Pa.
Clovespring Iron Works, New York.
Norristown Water Co.
Oliver & Co., Easton Sheet Mill.
Pottstown Iron Co.'s Plate Mill.
Parkersburg Flue Mill.
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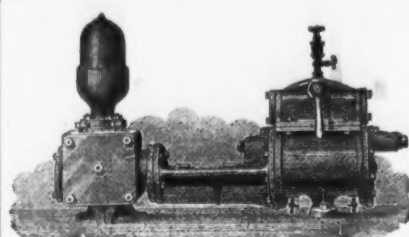
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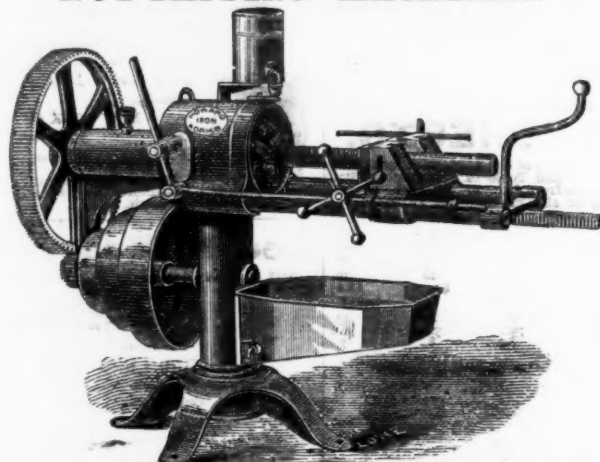
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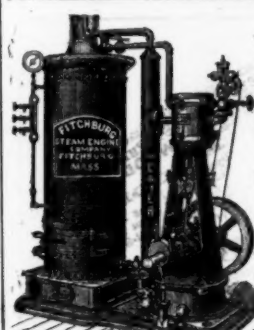
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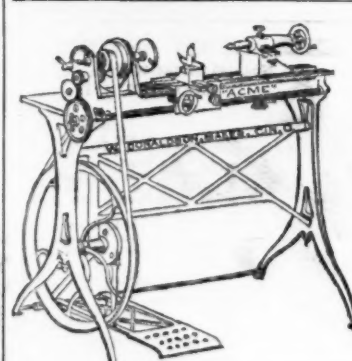
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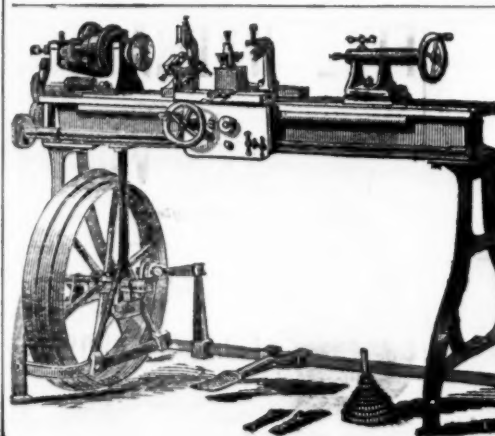
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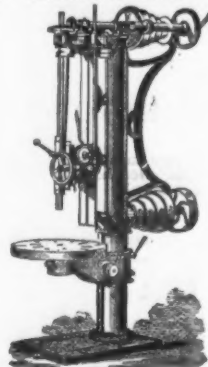
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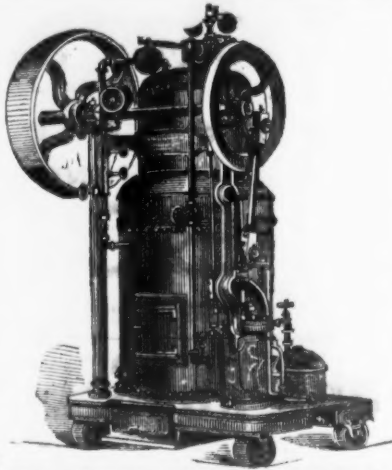
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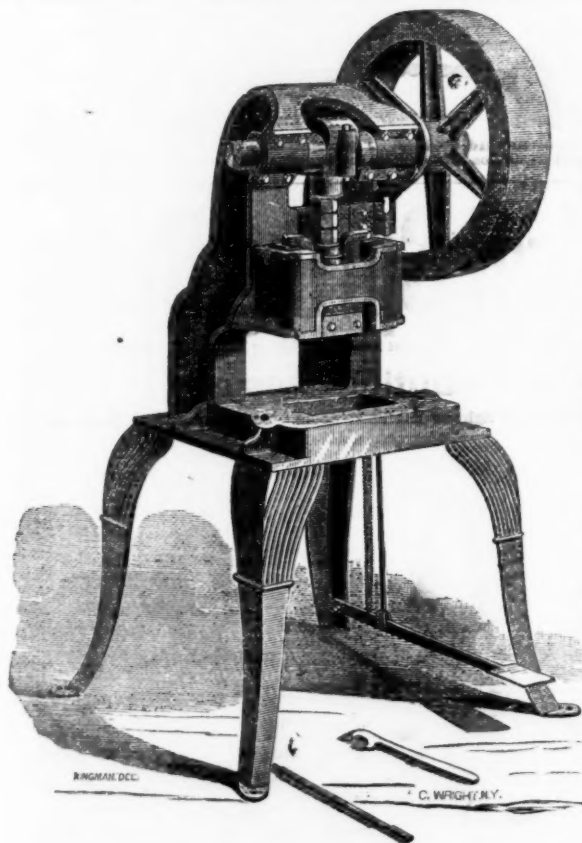
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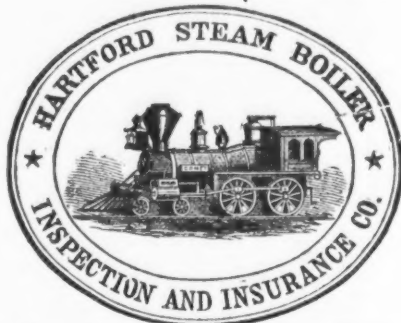
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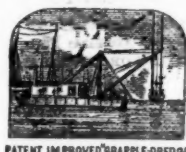
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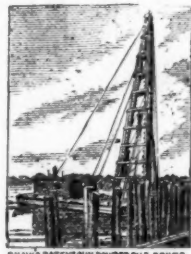
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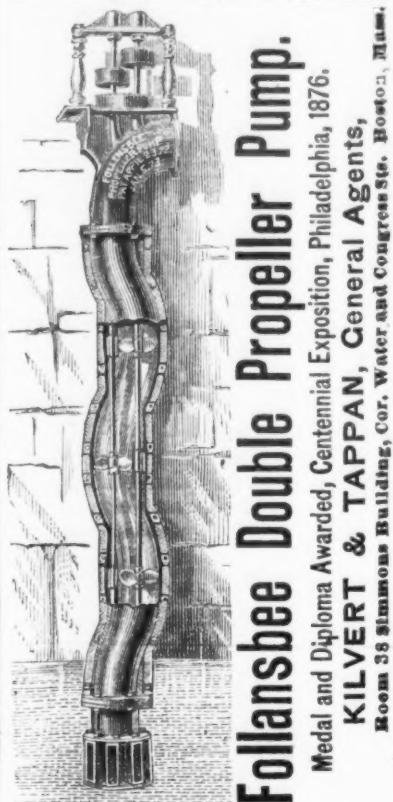
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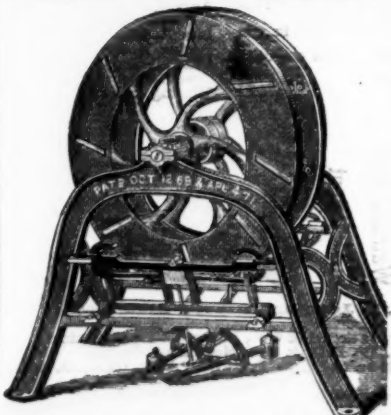
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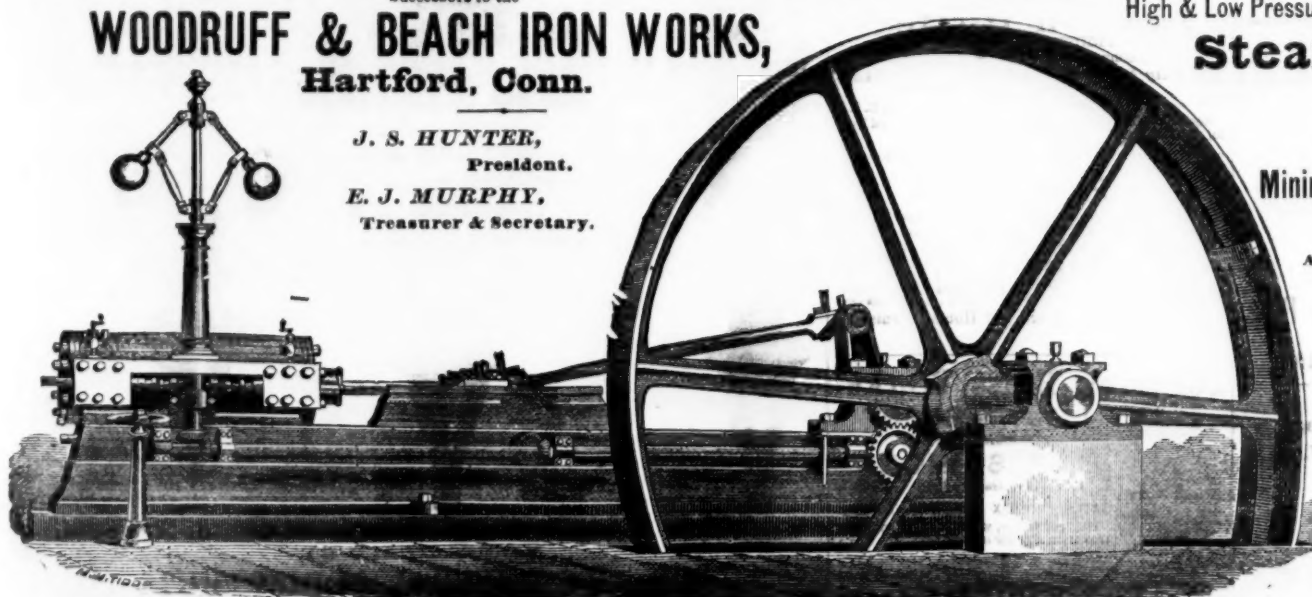
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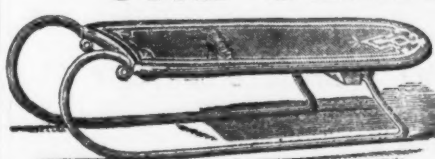
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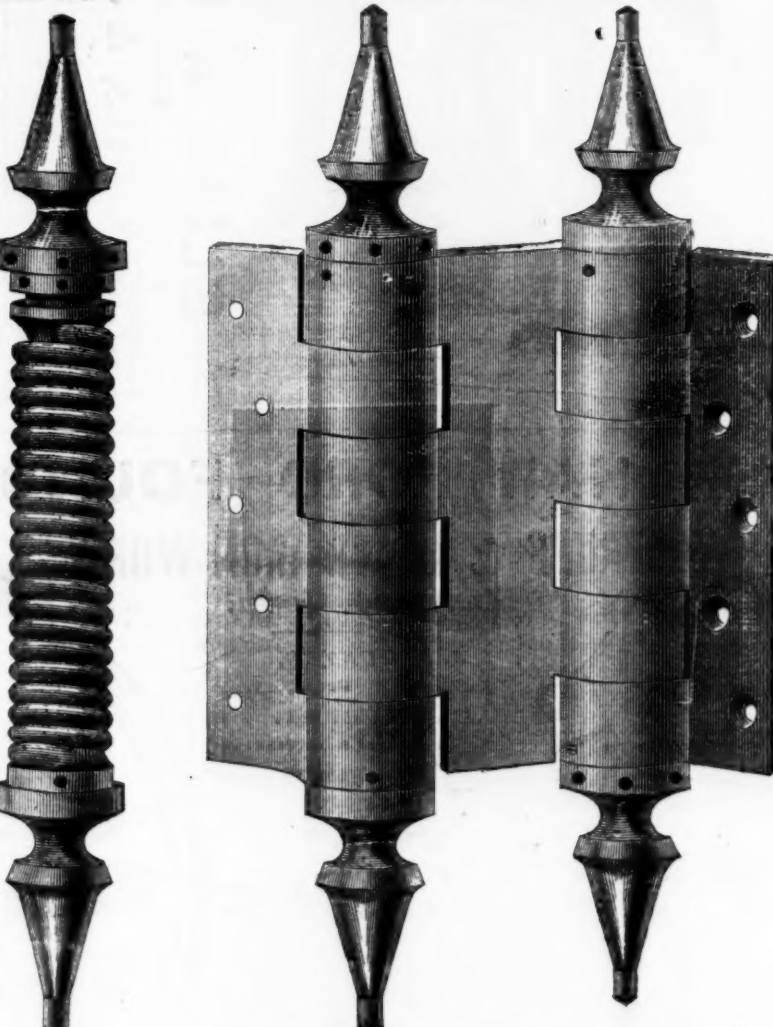
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